DOCUMENT RESUME

ED 200 732 CE 028 409

AUTHOR	Carpenter, Ted
TITLE	Calling the Tune: Communication Technology for Working, Learning, and Living. Worker Education and Training Policies Project.
INSTITUTION	National Inst. for Work and Learning, Washington, D.C.
SPONS AGENCY	National Inst. of Education (ED), Washington, D.C.
PUB DATE	80
CONTRACT	400-76-0125
NOTE	90p.; For related documents see CE 028 398-412.
AVAILABLE FROM	National Institute for Work and Learning, Suite 301, 1211 Connecticut Ave., N.W., Washington, DC 20036 (Order No.: PRM 3, $12.00).
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Access to Education; *Adult Education; Audiovisual Communications; Communications; Communications Satellites; *Delivery Systems; Educational Opportunities; Education Work Relationship; *Information Dissemination; *Information Networks; Job Training; Labor Education; *Mass Media; Postsecondary Education; Publishing Industry; *Telecommunications

ABSTRACT

This monograph develops a broad system of evaluation and classification of communication technologies from a public interest perspective. To do so involves applying concepts from the publishing world of print media to what can now be understood as an expanding system of electronic publishing. The paper also examines how the publishing elements in each system contribute to the communication needs of working adults and more specific applications to worker education and job-related training. In this context, the paper examines the primary existing communication systems; next it examines the new world of personal communication technologies; and then it looks at the kind of distribution technologies that link these systems and instruments together. Finally, the report distills a series of social policy issues that are common within this many-faceted tele-communications world. (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED200732

Worker Education and Training Policies Project

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

A. E. Lapointe

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Calling the Tune: Communication Technology for Working, Learning, and Living

Ted Carpenter

1980

CE 028 409

2

$12.00

This is one in a series of policy research monographs commissioned by the Project on Worker Education and Training Policies of the National Institute for Work and Learning.* Funding support for this project and the commissioned papers was provided by the National Institute of Education, U.S. Department of Education under contract number 400-76-0125.

The authors of the policy research papers in this series are knowledgeable analysts both from within and without the National Institute for Work and Learning. Their charge was to explore one or more issue areas which the project identified as being of significant interest to public and private sector decision makers concerned with shaping worker education and training policy and practice for the coming decade. Authors were asked to synthesize the relevant research bearing on the issue areas, to assess the knowledge base with a view to discerning the points of public and private policy relevance, and to use their best independent professional judgements in offering recommendations for action.

Therefore, it is important to note that the opinions and points of view presented in this and other papers in this series do not necessarily represent the official positions or policy of either the National Institute of Education or of the National Institute for Work and Learning.

Copyright © 1980 by the National Institute for Work and Learning. All rights reserved.

"Copyright is claimed until February 5, 1985. Thereafter all portions of the work covered by this copyright will be in the public domain." Per copyright authorization agreement dated 2/5/80, docket No. 860-80 between the National Institute of Education, U.S. Department of Education, and the National Institute for Work and Learning.

Formerly the National Manpower Institute

THE NATIONAL INSTITUTE OF EDUCATION

U.S. DEPARTMENT OF EDUCATION

HAS PROVIDED THE FUNDING SUPPORT
NECESSARY FOR THE DEVELOPMENT OF
THIS POLICY RESEARCH MONOGRAPH.

ABOUT THE AUTHOR:

TED CARPENTER

Mr. Ted Carpenter has had broad experience in the area of media policy and communication technology. He is the publisher of Media Rare Magazine and holds a variety of media counsulting positions. He was a Senior Staff member on the Second Carnegie Commission on the Future of Public Broadcasting and he founded and directed a program which produced educational and public affairs programming for education, cable, and public TV in Central Appalachia. On a Ford Foundation fellowship, Mr. Carpenter studied adult education and the media. His publications include "Videotape and the Adult Learning Process," which appeared in Instructional Media and Technology, 1975.

NATIONAL INSTITUTE FOR WORK AND LEARNING

NATIONAL ADVISORY COMMITTEE MEMBERS

For The
WORKER EDUCATION AND TRAINING POLICIES PROJECT

Ms. Marla Batchelder
Director of Professional Development
McGraw-Hill Publishing Company

Dr. Marvin Berkeley
Dean
School of Business
North Texas State University

Mr. Joseph M. Bertotti
College of Business Administration
University of South Florida

Mr. Len Brice
Executive Vice President
American Society for Personnel Administration

Mr. Bruce Carswell
Vice President
Human Resources and Administration
General Telephone and Electronics

Mr. John Chadwell
Manager
Personnel Administration
Owens-Illinois, Inc.

Mr. Robert Craig
Director of Communications
American Society for Training and Development

Mr. Walter Davis
Director of Education
AFL-CIO

Mr. Richard Drabant
Manager, Marketing
Chrysler Institute
Chrysler Corporation

Dr. Murray Frank
Dean
College of Public and Community Services

Mr. Donald Fronzaglia
Director of Personnel
Polaroid Corporation

Mr. Sean Gibney
Director
District Council #37
Education Fund, AFSCME, AFL-CIO

Mr. William Gary
Director
Department of Social Action
International Union of Electrical, Radio and Machine Workers (IUE)

Mr. Nathaniel Hackney
Hospital & Health Care Employees Union
District 1199 - Training Fund

Dr. James Hall
President
Empire State College

Mr. Reese Hammond
Director of Education and Training
International Union of Operating Engineers

Mr. Richard Holan
Director
Education and Training
United States Steel Corporation

Mr. Richard Hupp
Director of Recruitment
Kimberly Clark de Mexico, S.A.

Mr. Carroll Hutton
National Education Director
United Auto Workers

Mr. Robert L. Jones
Director
Personnel Programs and Services
General Motors Corporation

Mr. John Kulstad
Director
Education Department
Communication Workers of America

Dr. Norman Kurland
Executive Director
Adult Learning Services
New York State Department of Education

Ms. Joyce Miller
Vice President and Director of Social Services
Amalgamated Clothing and Textile Workers Union

Mr. Robert Nielsen
Assistant to the President
American Federation of Teachers

Mr. John A. Stagg
Director
Education Department
Graphic Arts International Union

Mr. Peter Williams
Program Director
Educational Development
IBM Corporation

Dr. Roger Yarrington
Vice President
American Association of Community and Junior Colleges

Mr. Kiernan O'Reilly
Director
Management Education & Functional Programs

Dr. Russell Farnen
Assistant to the Executive Vice President
Empire State College

FOREWORD

When this policy monograph by Mr. Ted Carpenter comes to the reader's eye, many a reference to communications technology and marketplace developments in the future tense could well be outdated. The momentum of change, which seems almost inherent in the technology itself, is being advanced by external events as well. Consider even the effects of events in distant Afghanistan. Having forced a temporary shelving of Senate consideration of the SALT II treaty, deliberation on several proposals for major revisions of the Communication Act of 1934 has been moved up on the legislative agenda. With deregulation of key apsects of the communications industry and marketplace a recurrent theme in these proposals, there is ample reason to believe that the technology, the communications marketplace, the American home, school, labor hall and workplace - not to mention the institutions of work and learning - are likely to undergo significant changes and to begin interrelating in new ways much sooner than presumed only a few months ago.

As one senior level education official noted in March, 1980, current developments in the communications marketplace are going to "turn education policy right on its head". Coming to grips with the technology and with its implications for education policy requires more than a cataloguing of new equipments and their present and prospective applications. It requires beyond that an understanding of the social, political, economic and institutional context in which the technology has emerged and would be applied. This monograph by Ted Carpenter provides the reader with an inventory of the technologies, and with a richly detailed description of the contextual environment in which that technology and its uses and governance are being shaped. Beyond that, Mr. Carpenter presents a construct - that of electronic publishing - which permits the lay reader as well as the expert a new vantage from which to view the technology and to judge the public policy issues involved here, such as deregulation of the communications marketplace, editorial control over the "software", concentration of ownership, the copyright question, and privacy.

To attempt to define the audience of interest for this important paper would serve only to fill several pages and then miss over half of the appropriate audience. The effects of telecommunications developments on virtually every aspect of "working, and learning and living" are so pervasive as to commend this insightful paper to any expert or layman with an interest to better understand the technologies involved, where they take us, and with what effect. The reader will find this paper a valuable investment of his time. He will find the analysis and description to be not only timely, but written clearly, concisely and engagingly, as well.

Gregory B. Smith
Director
Worker Education & Training Policies
Project

CALLING THE TUNE

TABLE OF CONTENTS

Page

I. INTRODUCTION....1

II. PUBLIC NEEDS AND COMMUNICATION SYSTEMS....2

III. PUBLISHING ELEMENTS OF TELECOMMUNICATIONS....8

IV. ELECTRONIC PUBLISHING AND MARKETPLACE OF IDEAS....11

A. Commercial Broadcasting....13
1. The Sponsor/Editor/Audience Mix in Commercial Broadcasting....14
2. Communication Needs and Commercial Broadcasting....17
B. Instructional Broadcasting....19
1. Communication Needs Assessment....21
C. Public Broadcasting....23
1. Social Policy and Public Broadcasting....25
2. Communication Needs and Public Broadcasting....26
D. Cable Television....27
1. The Sponsor/Editor/Audience Mix and Cable TV....28
2. The Cable Audience and Public Access....29

V. PERSONAL TECHNOLOGY - THE SECOND REVOLUTION....32

A. Videocassettes and Videodiscs....33
B. Black Boxes - Adaptor Technologies....37
C. Address Terminal Systems....39
D. Computer Terminals....41

VI. COMMON CARRIER, COMPUTERS, AND COMMUNICATIONS TECHNOLOGY -- THE THIRD REVOLUTION IS CALLED TELECOMMUNICATIONS....46

A. From Waveform to Digital Form - A Marriage Made in Space....48
B. Common Language and Common Carrier....49
C. Cross-Fertilization in Telecommunications Systems....50
D. The Final Mile -- Enlarging the Home Space....51
E. Fiber Optics and the Final Mile....53

VII. THE INTEGRATED VIDEO COMPONENT....55

VIII. SOCIAL POLICY ISSUES....57

A. Market or Mandate -- The Deregulation Issue....58
B. Information as a Product -- Social Equity in a Marketplace of Ideas....60
C. Editorial Systems....61
D. Network....63
E. Learning Centers....64
1. Learning Centers as Brokers for Information and Education....65
2. Tutorial and Support Services for Learning Systems....66

F. Ownership, Concentration, and Control.....69
G. Copyright -- The Rights of Creative Labor.....72
H. Component Integration and Standardization.....74
I. Privacy.....75

IX. TELECOMMUNICATIONS PUBLISHING.....75

REFERENCES.....79

I. INTRODUCTION

A mass entertainment medium is suddenly shifting to an electronic publishing system of great virtuosity.

The television set is perhaps second only to the automobile in its ability to enchant, capture, involve, and even define Americans in their daily patterns of working and living. The TV instrument has now been with us for half a century and is turned on in the average American home for six and one-half hours a day. However, just as we seem to have settled in with this piece of communication technology--and most generations have now grown up taking it for granted--the technology of entertainment and information media is suddenly changing.

How do we understand this new communications environment? Pieces of it are being introduced to us at a rapid pace as videocassette and videodisc machines enter the home, and video games and small personal computers also compete as attachments to our TV set. Moreover, the satellites in space that so quietly began to assume responsibility for our long distance telephone calls are suddenly feeding live olympic events and tragic political downfalls into our home television and radio sets. Even Walter Cronkite, the television eminence who daily assures his viewers that "that's the way it is," now subtly replaces references to television news with "news media" to encompass the expanding technology at his and our disposal.

To add to the complexity of what is now referred to as the "telecommunications" system that is evolving about us, it is important

to understand not just the separate technologies, but the interrelationship of these systems and devices. For example, why has AT&T, our monopolistic national telephone service, been granted the right to compete with private satellite services to deliver television signals? Why is IBM, our largest computer technology firm, a partner in one of these competing satellite networks? Why is the Control Data Corporation leasing some of this satellite time as a network for corporate educational centers based on computerized learning systems? What does this mean for Instructional Television, as it also has leased satellite space and is developing computer assisted videodisc applications for educational programs? Where do worker education and job training applications of these media leave off and where does lifelong learning through personal technology in the home begin?

Such questions are no longer idle speculations on some distant scientific future. They are immediate forces in the marketplace, and they are pressing hard against the constraints of public policy, educational policy, and government regulation of communication systems. The Congress--primarily through the House Subcommittee on Communications--has just concluded a wide-ranging and bold attempt to rewrite the Communications Act of 1934 to confront the new reality of expanding telecommunications technology. The 1934 act was significant in that it added television to the 1927 Radio Act, feeling that both "new" technologies involved the use of "scarce" public airwaves and must be regulated by government to preserve the "public interest" in a free flow of information for a "marketplace of ideas."

The present rewrite effort in Congress looked at our new technological environment and felt that the public interest was instead served by a

deregulated marketplace, allowing new and emerging technologies to compete freely in serving the communication needs of the public. However, the House Subcommittee on Communications has recently decided to terminate this two year rewrite effort. One of the reasons for ending the rewrite process and shifting to piecemeal consideration of new technology issues was the failure to develop a political consensus on where the public interest should lie--as a function of private markets or government mandates. Curiously, even industry spokesmen became divided over which approach would benefit their corporate interest.

How is an informed public going to decipher this continuing debate and determine its best interests? How do we maximize the benefit to the public of an information flow for working, learning, and living that is at the heart of any communication system? It is the purpose of this paper to develop a broad system of evaluation and classification of communication technologies from a public interest perspective. To do so involves applying concepts from the publishing world of print media to what can now be understood as an expanding system of electronic publishing. We will also examine how the publishing elements in each system contribute to the communication needs of working adults and more specific applications to worker education and job-related training.

In this context, we will examine the primary existing communication systems; next we will examine the new world of personal communication technologies; and then we will look at the kind of distribution technologies that link these systems and instruments together. Finally we will distill a series of social policy issues that are common within this many-faceted telecommunications world.

II. PUBLIC NEEDS AND COMMUNICATION SYSTEMS

One of the problems in sorting out competing claims and benefits of communication technologies is that most of the players are out to promote their own interests while often arguing that their approach furthers some vague concept of the "public interest." For example, AT&T touched off the Communications Act Rewrite debate in Congress by introducing the "Bell Bill." They argued that, just as it was found in the public interest to allow AT&T a natural monopoly to build basic telephone services, similar monopoly positions should be protected as new communications firms compete with AT&T to sell private phone terminal devices or data transmission networks for computer systems. When Congress tilted toward deregulation and open competition, a coalition of unions said that it was against the public interest to apply such deregulation to television broadcasters. However, many of the unions were representing producers and artists who wanted to protect their copyright and program syndication profits against a more diverse marketplace system. Is this in the public interest?

The above examples demonstrate why we must have a more definitive grasp of the public interest value of communication services. We must have an analytical and evaluative system distinct from individual technologies and the vested interests of each industry--from manufacturers to program producers. One way to do this is to examine such technologies from the point of view of the communication needs of working adults. As all of us conduct our daily affairs we have a constant need for information and communication. For the purposes of this paper, we will propose five basic needs:

Communication Needs of Working Adults

1. Entertainment and news
2. Citizenship education
3. Consumer and family education or services
4. Job training/upgrading or professional skills
5. Continuing education/lifelong learning

The mixture of entertainment and news is as old as the wandering minstrels and fiddlers who naturally carried news and tidings as they travelled from community to community to play their music at social events and festivals. Modern day pipers are no exception as the dominant entertainment medium of broadcast television has replaced the newspaper as the most common source of news.

In our democratic society, however, general news and entertainment are joined by a deeper commitment to the role of autonomous media--independent of government--as an unfettered source of information and ideas for the practice of good citizenship. Such assumptions underlie the basic First Amendment freedoms of communication media and the professional autonomy of the journalistic tradition in publishing media. The courts have long affirmed and protected this tradition that "speech concerning public affairs is more than self-expression; it is the essence of self-government." (1)

If citizenship education in media is an essential component of self-government, the role of media in consumer education and family services is also vital to the workings of the contemporary marketplace. Media (and often the advertising that may support them) are essential sources of information on products, goods, and services. Moreover, electronic equivalents of the printed catalog can allow expanding

opportunities for the media to provide channels of commerce and financial transactions for informed consumers.

Employment training is one of the most extensive and continuing uses of media technology. Expenditures for training in industry are estimated at $100 billion a year--equal to expenditures for primary, secondary, and college educations combined. (2) Employment related training is also readily accessible to benefit the job growth and career enhancement of working adults. The videocassette and personal computer devices that are only now entering the home consumer marketplace have long been used by industry for training and information dissemination, and this arena is often an innovative proving ground for applications of educational technology to adult learning.

Finally, each new communication technology continually revives and expands the collaboration of adult and non-traditional educators with media specialists. Private voluntary organizations, public and private schools, and universities have been leading innovators in applications of new technology to lifelong learning needs. They have recently led in exploring the new distribution systems of cable TV and satellite technology, as our following analysis will demonstrate.

A consistent theme throughout all five categories of communication needs for working adults is an emphasis on the value of independent and self-directed learning--what is often referred to as non-traditional study. The Carnegie Commission on Non-Traditional Study developed a comprehensive definition of this process which can serve us well as a single concept for the communication and learning needs that can be served by technology:

> [Non-traditional study] is an attitude that puts the student first and the institutions second; concentrates more on the former's need than the latter's convenience; encourages

> diversity of individual opportunity; and de-emphasizes the time and space or even course requirements in favor of competence and, where applicable, performance. It is not a new attitude; it is simply a more prevalent one than before. It has concern for the learner of any age or circumstance, for the degree-aspirant or the person who finds a sufficient reward in enriching life through constant, periodic or occasional study. It is an attitude that can stimulate exciting and high quality educational progress; it can also, unless great care is taken to protect the freedom it offers, be the unwitting means to a lessening of academic rigor and even to charlatanism. (3)

New communication technologies are often seen as an expanding and innovative resource to meet the educational needs of working adults in the context of non-traditional study--yet they often pose both a promise and a contradiction. They are a promise because new technologies are allowing information and learning resources to be spread widely through vast distribution systems to homes and places of work--with variable time schedules, flexible patterns of use, and inventive devices that allow working adults to participate in a self-directed learning process.

However, recent studies have shown that even the most highly motivated adult workers who desire additional education or training (and even have an employer's financial support) often fail to take advantage of these resources because there are insufficent guidance and support systems to help them realize this potential. (4) Moreover, there is a contradiction in non-traditional study through new technology in that the same technology that fans hopes for the inventive and wide distribution of learning resources to the home and work environment also raises doubts and questions about the validity of this kind of learning for job, career, and other forms of certified advancement. How does the educator, trainer, and employer attain a sufficient level of trust in these systems against more traditional forms of credentialled learning? Is the worker and learner subjected to appropriate tests and determinations of competence

sufficient to be rewarded with advancement in his or her workplace or profession? These issues must be addressed as we look at the learning, training, and information characteristics of communication technologies.

The above five categories of communication needs of working adults and the general concept of learning embodied in non-traditional study will help us define communication technologies in the following analysis as we determine their ability to meet one or more of these needs. However, filling these needs is often a function of the unique elements of each communication system. We must also have a way of discovering these functional elements of media technology in terms of a common language and value system that are divorced from each individual technology.

III. PUBLISHING ELEMENTS OF TELECOMMUNICATIONS

We have become so dominated by the mass media applications of commercial television and radio that we often forget that television and radio are really distribution systems capable of handling a wide variety of communication needs. This larger role of information distribution to the public is really a form of publishing. Publishing is not just a print media concept, but rather a word meaning "to issue or to cause to be issued, in copies made by printing or other processes (italics mine), for sale or distribution to the public as a book, periodical, map, piece of music, engraving, or the like."

In the expanding world of telecommunications, from home computers to videocassettes and satellite delivery systems, the forms of voice, image, and data communications they foster are really electronic engravings in an electronic publishing system. Voice (radio and phone), image (TV and video), and data (computer) transmission are the basic forms of electronic

publishing. However, we need to look at the functional elements of these electronic publishing systems to understand their value as information providers.

The Sponsor/Editor/Audience Mix - The Functional Components of Communications Publishing

Most communication or publishing systems involve a mixture of sponsorship, an editorial function, and an audience in performing their unique service as information providers. The sponsor is a familiar figure in communication history prompting the knowing cliche that "he who pays the piper calls the tune." Knowing what kind of sponsor supports any given media technology or service is an important element in assessing its public interest focus. When television and radio broadcasting first began, programs were not sponsored. Rather they were a service designed to attract viewers and listeners who would buy the new TV and radio receivers. It did not take long, however, for the Hallmark Hall of Fame and the Jack Benny Jello Hour to fill our screens. While the role of advertiser sponsorship is now more discreet in commercial broadcasting, there is also a growing concern about the influence of corporate underwriting in public broadcasting as the Mobil Corporation, for example, brings us A Masterpiece Theatre program.

Shouldn't he who pays the piper call the tune? Why the concern about public broadcasting? Anxiety about the sponsor role must be understood in the context of the editorial function in a communication system. To understand the editorial function, it helps to examine how this role evolved in the print media. In the early history of printing, paper and presses were rare and expensive devices. Publishing was dependent on wealthy patrons or sponsors who were willing to pay to have books printed. Both the

creative artist or journalist and the potential audience for their work were at the mercy of a small community of wealth that decided what works to patronize.

The invention of the "penny press" changed all that. It made printed works so cheap that readers or subscribers could afford to pay for what they wanted. Printers and publishers were suddenly able to be accountable to the communication needs of a broad, diverse, and paying audience. What is more, since any given public has a kaleidoscopic variety of information needs and interests, publishers had to develop the skill of discovering what artistic and journalistic efforts would satisfy a variety of audiences. However, determining what authors and artists would appeal to audiences became a complex and idiosyncratic craft that developed as a specialty of editors and is the process described as the editorial function. Michael Lane describes this tradition in the book publishing industry:

> An editor, they say, does not have skills. Using a term I find highly revealing, they say that an editor has flair - something intangible and intuitive. Yet the senior editor at a general book house is responsible for discovering, judging, and coordinating the production of a work in a world where there are no fixed standards to establish its worth; and then the publisher must sell it to an undefined and thus far unpredictable market. (5)

Clearly a system which balances the demands of a sponsor to achieve an editorial focus on a variety of audience needs and interests has a more visible public interest value than systems that serve only the needs and prejudices of a few sponsors. John Chancellor commented on this editorial function when asked if it was possible to do sound journalism on television and still deliver profits based on advertiser sponsorship.

> The good journalist knows that, and knows that it can be accomplished through an arrangement which is peculiar to journalism: a special kind of compact between the editorial side and the business side in which each promises not to damage the other too much. (6)

This distinct editorial function is present in some form in all systems--whether a dominant force in its own right on behalf of an audience, whether a direct function of a sponsor's editorial preference, or as a direct access function by audiences themselves to choose and manipulate their own information sources.

The audience, therefore, is the ultimate benefactor or consumer in communications publishing. The potential program interests and information needs of audiences are inexhaustible and constantly changing. It is not wise or easy to categorize audience interests, for the individual viewer/consumer/listener does not function in categories; rather individuals in an audience are like pieces of glass in a kaleidoscope that are constantly shifting and joining a variety of audience clusters for any given program or information service.

IV. ELECTRONIC PUBLISHING AND THE MARKETPLACE OF IDEAS

The rights and concerns of an audience have often been embodied in the goal of a "marketplace of ideas"--a free flow of artistic, journalistic, and information sources to a needy public. In terms of legislative and regulatory policy, this goal is often translated into "diversity" in the ownership and content of electronic media. It is the principle of diversity that underlies the concept of granting television and radio licenses in each local community so that a multitude of editorial judgments reflect a variety of audience and community needs.

The fact that there is limited channel or "spectrum" space in any given community also led to regulatory restrictions on local broadcasters to insure that their programming was based on a doctrine of "fairness"--

to represent the interests of viewers and listeners and not just the views of individual broadcasters. In the landmark Red Lion case upholding the Fairness Doctrine, the court held:

> Because of the scarcity of radio frequencies, the government is permitted to put restraints on licensees in favor of those whose views should be expressed in this unique medium. . . . It is the right of viewers and listeners, not the right of the broadcasters which is paramount. . . . It is the purpose of the First Amendment to preserve an uninhibited marketplace of ideas in which truth will ultimately prevail, rather than to countenance monopolization of that market by the government itself or a private licensee. (7)

However, the first sentence of this quote points out that governmental regulation to achieve diversity was justified "because of the scarcity" of frequencies in broadcasting. The court noted in the last section of Red Lion that should scarcity cease to be an issue, this point of law may change. Furthermore, why are newspapers exempt from such regulation when less than 50 of the 1,550 cities in this country have two or more competing newspapers (8) while most cities have 3 or more TV channels and many radio channels?

The answer is partly because newspapers are viewed as only one component of a vast and varied print publishing system that includes magazines, books, newsletters, house organs, pamphlets, etc.; while in electronic media, radio and TV broadcasting have been the only game in town for most of their history. However, as the electronic media diversify and develop new technologies and distribution systems, the nature of achieving diversity may change. Will it be wise to continue trying to wring the ideal of diversity from broadcasting systems or would it be wiser to seek diversity in a multitude of electronic information technologies?

In this context, it must be understood that the "marketplace of ideas" in commercial broadcasting is really a misnomer. Information and programs are not exchanged freely in a market of viewer or listener preferences. Programs are byproducts of commercial sponsorship and the creation of mass audiences for advertisers. Changing technologies raise the question of whether electronic media should continue to be defined largely as the mass entertainment and news medium so brilliantly emphasized by commercially sponsored braodcasting--or whether electronic media will become an electronic publishing system with the virtuosity and reach of print.

To fully answer this question, we must look at what exists today as major communication systems--largely commercial and noncommercial broadcasting with a growing cable TV presence--and then go on to examine the new personal technologies and radically transformed distribution systems that are changing the character and range of electronic media. As we look at each system, we will evaluate them against the background of the five communication needs of working adults and in terms of the sponsor/editor/audience mix that is characteristic of each system or technology.

A. Commercial Broadcasting--The First Revolution

Radio and TV were a wonderful revolution in communications media when they burst upon our lives. Accustomed as we were to the printed page, the television in particular became an enchanting magic box with marvelous moving images and sounds dancing in our own living rooms. As expensive a piece of technology as it first seemed, it quickly entered the homes of virtually all Americans. With the early advent of network

connections between stations, CBS, NBC, and ABC became extraordinary mass communication systems with a simultaneous reach to American audiences that rivaled in extent and immediacy anything in print. And thanks to advertising, it was free to all.

With this extradinary reach to national mass audiences through networks of local broadcast stations, commercial broadcasting quickly became a great democratizer and common denominator (if lowest one) of entertainment and news dissemination. From Uncle Milty and Edward R. Murrow to Mork and Mindy and Bill Moyers, commercial television and radio have given us a shared national culture and shared national experiences. Moreover, commercial broadcasting cannot be overlooked as a major learning device. The impact of television's coverage of the space program on public support for government policy in space exploration cannot have been small. The medium also brought Vietnam and Watergate into our homes and consciences, contributing to an informed public which influenced government policies in a way unmatched in history.

1. The Sponsor/Editor/Audience Mix in Commercial Broadcasting

For all the fascination with commercial television, it is matched equally by nagging frustration and disappointment. A more disciplined look at the relationship between the sponsor, editorial function, and audiences will tell us why such a marvelous device is so frustratingly limited. The sponsor, of course, is the advertiser of products. As pointed out earlier, there is no real "marketplace of ideas" where audiences purchase the program services they value. Rather, the marketplace in commercial broadcasting involves the selling of audiences to

advertisers for the display of products. In functional terms, this places a rigorous requirement on commercial broadcasters to produce the largest possible mass audience of 18-49 year old consumers, for that is the most cost-effective audience for product advertising.

One impact of the sponsor requirement of mass advertising audiences is to undermine the principle of diversity in local broadcast stations, particularly in television. Local stations attract more dollars from sponsors by using standard programming through national networks or syndicated networks, rather than splitting up their programming among many small and distinct local audience preferences. Such an environment is fertile ground for mass entertainment, but both local and national news are largely limited to headline news, since in-depth journalism tends to split up audiences into smaller interest groups. Furthermore, when local network affiliates sign up for a network news show, their contract forbids them from changing the news content--an agreement no self-respecting local newspaper publisher would accept from the Associated Press.

Clearly, the editorial function in commercial broadcasting is severely limited by sponsor demands for mass audiences for advertising. Artists, producers, and journalists are limited to creating programming that appeals to mass tastes and interests and are not free to seriously address the multitude of specialized, particular, and minority interests common to any individual, group, or community in any information-hungry audience.

However, within these advertising constraints, the editorial leadership has been gaining more and more freedom. Advertisers used to produce their own shows until they were finally forced out by network

programmers who allow advertisers to buy program audiences but not to edit the shows. In recent years, independent program producers, primarily in Hollywood, have also won more freedom from network interference in the creative process of developing mass audience programming.

Clearly, commercial broadcasting has pleased a massive audience. In any given evening, over 95% of homes with television (and that's just about everyone) have watched at least one program and usually more. We know this because the role of sponsorship in advertising requires that audiences be carefully measured by ratings, and the ratings have proven to be fairly accurate reflections of actual viewer behavior.

The audience, however, is not really defined by ratings. The audience has a passive role in commercial broadcasting, only signalling its willingness to participate as a statistic in measured mass audiences for free programs as byproducts of advertising. We don't know what audiences would really value and what interests aren't served, because no marketplace allows such an audience-program exchange.

Given this passive audience limitation, government regulation is often used as a way to increase the accountability of commercial broadcasters to public interests. Local broadcasters are required to "ascertain" community interests by talking to community leaders, and they are accountable to equal employment opportunity practices and affirmative action programs for minorities and women. The Federal Communications Commission, the regulatory arm of Congress, also limits the amount of commercials and requires minimal amounts of news vs. entertainment.

However, none of these regulatory mechanisms guarantees that particular programs will serve particular audience needs, short of the mass audience standards of broadcasters. Indeed, they shouldn't, for such government tinkering in the editorial function of program decision-making is expressly prohibited by the First Amendment. Scarce airwaves permit government regulated fairness, so that a station endorsing a political candidate or attacking an individual, for example, must allow its audiences to hear opposing points of view. But, the same act makes it clear that "nothing in this chapter shall be understood or construed to give the Commission the power of censorship over the radio communications or signals transmitted by any radio station, and no regulation or condition shall be promulgated or fixed by the Commission which shall interfere with the right of free speech by means of radio communication." (9) This principle was brought home recently when the Family Viewing Hour for limiting sex and violence in prime time television programs was struck down by the courts as an improper use of the regulatory power of government, and perhaps even an improper use of network dominance over local broadcasters.

2. Communication Needs and Commercial Broadcasting

The sponsor/editor/audience mix tells us much about the strengths and weaknesses of commercial broadcasting as a communication system. Looking at its ability to serve the five communication needs of working adults is even more revealing. Commercial broadcasting clearly excels in the first category of mass entertainment and news. However, the more in-depth journalistic requirements in citizenship education are distinctive but exceptionally rare achievements of this medium.

The rest of our list of consumer, learning, and training needs are clearly not served well here, primarily because they require the kind of focus and depth that reaches small, selective audiences periodically, a kind of audience fragmentation that sponsor-induced mass advertising cannot tolerate. It is a system that cannot afford to tailor and individualize its resources. Furthermore, while we know there is an immense amount of learning in commercial broadcasting, it is impossible to specify; you are never sure who is learning what, so it cannot be credentialed and used for career advancement. Lastly, this commercial system has spoiled us. It is not only free, but its rich resources allow the highest technical and production standards, two facts which limit the appeal of many alternatives, whatever the perception of public need.

The strengths and weaknesses of commercial broadcasting as a publicly valued communication system are partially revealed in Michael Halberstam's anecdote about Bill Moyers and CBS. Moyers, a skillful public affairs journalist, left Public Broadcasting to join CBS News because, even though he would be on the air only occasionally, he could reach a far vaster audience than in public television. Later, frustrated by CBS's infrequent use of his public affairs documentaries, poor scheduling in low viewer time periods, and lack of promotion, he decided to leave. Bill Paley, Chairman of CBS, asked Moyers what he could do to keep him. "A regular prime time show," said Moyers, "much like Murrow had. On a regular schedule and a set hour." Paley replied, "I can't do it anymore. The minute is worth too much now." (10) Where did Moyers go when he couldn't meet the prime time audience needs of advertisers? Back to public television.

B. Instructional Broadcasting

What we now know as Public Broadcasting was originally called educational or instructional broadcasting. This use of radio and television is still a strong and growing component of our noncommercial broadcasting system. Understanding how instructional broadcasting came about also involves understanding the regulated spectrum or channel space that broadcasters occupy. Broadcasters send their picture and sound in the form of a wave out over the air. It is this wave that your radio or TV antenna picks up and sends into your receiver. You use your tuner to select that channel, and it is displayed through your set. When broadcasting was first available, radio and TV buffs could transmit their signals at will. Unfortunately, they all began to interfere with each other in an electronic cacophony that served no one.

The government intervened, in 1927, to limit the number of channels on the spectrum in any given area, so that clear reception was guaranteed. This channel limitation or "scarcity" then became the basis of government regulation to insure that broadcasters used this limited resource as a public interest trust and not a private monopoly. This helped to insure a "diversity" of ideas. In 1952, the government again intervened to increase diversity in broadcasting by setting aside a number of local channels for noncommercial or what were then assumed to be nonprofit instructional or educational stations.

The sponsor/editor/audience mix tells us a lot about what was accomplished with this new resource in the instructional field. The licenses for instructional stations went primarily to schools and universities. Their sponsors became Federal, state, and local

governments through their educational budgets, foundations, local school budgets, and private or viewer contributions. These sponsors had both curricular and social policy objectives. The Carnegie and Ford Foundations, in particular, began to explore the promise of this technology for improved education, lifelong learning, and journalistically distinct uses of broadcasting for citizen education.

Because of the broader range of sponsorship, the editorial function became much more distinct than in commercial broadcasting. Educators and media producers were free to concentrate on the educational needs of their audiences. However, from its earliest days, instructional broadcasting has had an editorial split between those who feel television and radio are best suited to more general and non-traditional forms of education and those who advocate more rigorous and credentialed approaches tied to a curriculum. Additionally, the Federal government, in granting the noncommercial licenses to promote diverse resources for public communication, also took a curious slap at its editorial independence with a restriction that remains to this day; noncommercial stations may not "editorialize" by endorsing political candidates or points of view, even if they operate without government money.

Audiences quickly developed a different relationship to instructional broadcasting, for here fragmentation is welcomed and small group educational needs catered to. Many have become financial supporters or volunteers and enroll in courses to sustain this struggling medium now completing its second decade. In sum, instructional television has learned to serve small but loyal audiences. However, given the expense of broadcasting and the commercial competition, the small, fragmented audiences provide a weak political and financial constituency to attract adequate funding.

1. Communication Needs Assessment

In spite of internal conflicts and snubs from both traditional educators and commercial TV producers, this struggling industry has gradually proven it can deliver instructional services that are often as effective as standard curricular approaches. This system is not strong on mass entertainment and news, but is wholly committed to the remaining education, training, and service criteria within the limits of small broadcast audiences.

Leaders in instructional television have also been pioneering in uses of their broadcast medium for the education of working adults in non-traditional forms, using the distribution mechanism of a broadcast signal to bring educational resources to the home and workplace in order to involve adult learners who do not have access to traditional forms of curricular study. However, instructional television has had to struggle against the contradiction that its ability to expose adult learners to educational services is not always matched by an equal ability to provide sufficient support services and the certification necessary to assure wary employers and educators of levels of achievement and competence resulting from the use of these services by adult workers and learners.

The experience of Kentucky Educational Television demonstrates that progress is being made. The KET/GED series was designed and produced in 1974 to assist the adult who had not finished high school by preparing him to take the GED examinations. The series was developed entirely by state and regional funds and distributed nationally in 1975 by the Cambridge Book Company. HEW and other Federal funders did not provide support, because they were uncertain that the system "would teach," were

doubtful it could reach the non-high school-certified adult, and were not sure the GED test would be continued.

Six years later, the KET/GED series is being used in 40 states by over 400 different learning institutions. In Illinois, 35 of the 48 community colleges, 4 of the 6 PBS affiliates, all correctional institutions, the city community college system, and all libraries in Chicago provide the service. In one study where the GED series was the only variable, referrals to the GED exam increased 27%, the pass rate increased 4%, and the quality of the pass work increased 22%. The Chicago public television station found that its series was viewed by 75,000 viewers. Since the achievement of high school certification increases the salary of the average adult by $1,200 annually, this is no small contribution to worker education needs.

West Virginia Wesleyan offers college credit courses by radio to non-traditional students. Target audiences are those who find it difficult or impossible to attend campus classrooms: housewives, working adults, the blind, and physically handicapped.

The University of Mid-America is a consortium of nine state universities in the midwest that designs and produces television courses for college credit. Governed by a Board of Trustees made up of nine presidents of state universities in six contiguous states, UMA offers no credit on its own. Each college evaluates and determines if the course is to be used and credit to be offered through its own institution. Studies of the first 5,500 adult learners enrolled showed that the majority were women, at an average age of 37, who were homemakers with children. Fifty percent had no previous college experience or none in the past five years. The median income was $11,000, and these adult

learners were equally dispersed among city, farm, and ranch dwellers. Two-thirds said they had a degree objective, documenting a large, untapped adult continuing education need that can be reached through instructional broadcasting.

C. Public Broadcasting

In 1952, when noncommercial channels were set aside by the government, another kind of station began to form along with instructional stations. One of the first was KQED in San Francisco. Rather than affiliate with a school, it formed an independent community board, along the lines of the then fashionable cooperative movement, and took for its editorial focus the needs of the broad public outside of instruction. KQED was, and still is, a leading innovator in public noncommercial programming and is one of many stations that began to grow apart from their instructional brethren.

The Carnegie Commission on Public Broadcasting was formed in 1967 to examine the growing potential of noncommercial television. When it issued its report, the Commission sided firmly with the broader public focus beyond instructional and, in fact, coined the term "public" broadcasting. They proclaimed the potential of broad social and educational objectives to bring general public culture and enlightenment to all Americans. They called on the simple eloquence of E. B. White, who said public broadcasting would be "our lyceum, our Chatauqua, our Camelot." The Chatauqua movement, in fact, was an early innovation in the lifelong learning tradition and showed the Commission's focus on public forms of non-traditional study through broadcasting.

The sponsor/editor/audience mix, as usual, reveals more of public broadcasting's capability. Its sponsorship involves a mix of support

from governments, foundations, corporations, and private or member contributions. All these sponsors have different motives at different times, knowing that public broadcasting has a wide range of options in serving audiences. Indeed, part of public broadcasting's uniqueness is that by skillfully combining funding sources so that no sponsor dominates, a more selective range of audience interests can be served by programming. Unfortunately, due to low funding levels, this skill is often held hostage to desperate pleas for funds.

However, the ability to concentrate on this broader spectrum of audience needs without fundamental advertising or curricular limitations makes public broadcasting the first truly distinct editorial medium in electronic publishing. Its editorial function in bringing together creative, journalistic, and information sources with a diversity of audience needs is its most predominant characteristic. There remains the traditional early conflict, however, between elitism and egalitarianism in editorial judgment. Should program directors pursue higher culture that audiences "need"--and many artists and journalists prefer--or develop a programming variety that reaches wider and more varied audience preferences?

The funding struggle often skews the editorial function toward focusing production talent on those areas that sponsors are willing to support rather than the more inventive focus on the potential mix of creative and journalistic capability with the interests of many selective program audiences. Still, NOVA, the symphonies, Sesame Street, and dramatic works on public television reach surprisingly mixed audiences. The figures tilt toward white collar affluence, but the presence of blue collar and minority audiences are clear and convincing.

In any given month now, 67% of the American people watch at least one program, a figure that climbs as the system gains support and skills. Also, such a broad mix of audience and program judgment varies greatly from station to station in local communities, an argument on behalf of promoting diversity through a variety of local licensees.

The audience still has a largely passive role (as in other broadcasting systems), but the editorial focus is much more sharply and selectively concentrated on the broader range of audience needs and interests. This is still an editorial and not an audience access or audience controlled communication system. Moreover, with the struggle for public and private funds, and growing programming skills, it is harder for public broadcasting to reach very small special interest audiences which affects many cultural, social, racial, and intellectual minorities.

1. Social Policy and Public Broadcasting

Of all the communication systems, public broadcasting has been under the most intense public scrutiny in recent years with both a second Carnegie Commission inquiry and a major Congressional review under the Communications Act Rewrite. It is worth glancing at their recommendations in terms of our analysis before considering a broader range of social policy issues at the close of this paper.

The second Carnegie Commission in its report, A Public Trust, argues that public broadcasting should continue to strengthen its focus as an editorial medium accountable primarily to audiences and not to government, corporate, or other contributing sponsors. The report calls for greatly increased government funding, tied by matching funds to levels of

audience support as a form of audience accountability. This increased funding flow should bolster the autonomous editorial function of program development through unrestricted Program Service Grants to stations and through the support of a distinctive Program Services Endowment.

Audience accountability is further emphasized in a specialized audience measurement system to insure that all Americans are served at least once a week or once a month with special audience samples to track minority and selective audience preferences. Finally, the resistance to sponsor domination is emphasized through governing boards and funding flows that are insulated from overt manipulation by government or corporate funders.

On the other hand, the Communications Act Rewrite of the House of Representatives had less faith in audience accountability measures and more faith in uninsulated government regulation as a surrogate for public or audience interests. They agreed with Carnegie on the need for an insulated and separate program fund called the Endowment for Program Development. This editorial function is not balanced by audience pressures to protect the public but by accountability to government policy in legislative mandates. Public broadcasters are therefore required by legislation to conduct board meetings in public and to spend portions of their program funds on independent producers, and they are still prohibited from editorializing on political candidates or public issues.

2. Communication Needs and Public Broadcasting

Between the instructional and general audience efforts of noncommercial or public television and radio, Public Broadcasting serves all five of the primary communication needs of working adults. Despite only a decade of

growth since funding was legislated by Congress, and severe shortages of adequate funding, public broadcasting has demonstrated its ability to deliver distinct program services to more selective, if still sizeable, local and national audiences.

D. Cable Television

Community Antenna Television (CATV) or cable TV is a broadband and not a broadcast technology. It came about as a way to get good television reception to people whose home antennas were too far from a broadcast signal or blocked by mountains, buildings, or other forms of interference from good reception. The cable system would put up a large master antenna, powerful enough and high enough for good reception, and then send this signal by a special broadband cable or wire to each home for a monthly fee.

Cable systems soon discovered, however, that the cable was capable of sending many television channels at the same time--hence the designation "broadband." By importing other station signals from more distant communities (including independent stations and public broadcasting), and perhaps adding their own programming, cable systems could offer many channels on the home cable, giving not only clear reception but greater choice on the TV dial.

As cable left mountainous and rural areas and became a major enterprise in larger cities and towns (even Manhattan), cable advocates proclaimed the end of "scarcity" with a new choice of program abundance in a "wired nation" linked by cable systems. The reality underneath these blue sky projections, however, comes clear as we look at the publishing characteristics of cable TV.

1. The Sponsor/Editor/Audience Mix and Cable TV

Cable television does mark the first system where sponsorship is not tied to a vested interest in particular programs or program audiences. Cable television systems are speculative investments with long term profits through audience or subscriber fees for the basic cable service and not for programs. The audience, therefore,holds the cable T.V. operator to account for improved program choice and/or reception or it won't pay the fee.

It is clear, however, that cable TV does not join public broadcasting as an editorial medium, for a distribution system does not a program make. Most cable systems do not create their own programming. They have some original services like the correct time, weather, UPI newswire, stock prices, old movie packages, or some local community programs. However, cable systems primarily bring in a greater mix of what broadcasters are already doing, even expanding now to "superstations" like Ted Turner's Atlanta Station that is now beamed by satellite to cable systems across the country, so subscribers can see Atlanta ball teams and a selection of syndicated movies. Cable TV is, in effect, the Reader's Digest of electronic publishing, repackaging and redistributing existing program fare with little editorial originality.

Pay TV appears to be the only significant exception to this pattern in cable TV. In pay TV, the cable system provides special programs or program packages--usually current movies, sports events, x-rated films, and nightclub acts--for an additional fee. Time-Life's Home Box Office and Viacom's Showtime are two pay TV services distributing their programs by satellite to a national network of cable systems for this extra-fee service. However, while in the short run pay TV is giving new life and

financial resources to a slowly growing cable industry, in the long run there are many other technologies lining up to compete for the same consumer dollar. Broadcast stations in many communities are using home devices to deliver a similar service over the air, and COMSAT recently announced a pay TV service direct from satellite to subscriber homes. We will explore this further in the next section on personal technology.

2. The Cable Audience and Public Access

The audience role in cable TV has also changed little within the basic cable service, with passive viewers having only an increased choice of similar broadcast material on their expanded dial. In its early development, however, government regulators required cable systems to provide "public access" channels where members of the audience could actually control their own programming.

This requirement spawned a small "access movement" to involve local communities in their cable access channels. Both government and foundation support provided some experimentation with new, inexpensive video production technology. However, in 1974, the FCC withdrew its requirement that cable systems do some local origination programming. Most cable systems stopped providing local production resources on any serious scale and withdrew long term support from access programs. Government and foundation funders then withdrew their support. Public access channels became blank spaces with no significant resources to fill them. Recent court decisions have also stated that government does not have the right to require access space of cable, saying they are entitled to First Amendment freedoms from regulation and are more like print publishers than broadcasters.

"Institutional access," however, has fared much better since local institutions often have the resources and clout to get free or leased channel space and to provide the equipment and personnel for local program services. Many schools lease channels for school curricula, training, and adult continuing education. The University of Michigan uses cable to train firemen on duty. In Reading, Pennsylvania, the National Science Foundation supported an innovative experiment linking senior citizens in community centers by two-way cable. Many of these uses are much like the early experimentation with instructional broadcasting.

What remains distinctive about cable, however, is not its contribution to programming, but its multiple channel distribution capability which extends the mix and reach of existing broadcast and syndication programming. The experience of Vincennes University sums up this marginal shift in the range of existing resources through cable.

> This two-year Indiana college has been described by its president, Dr. Isaac Beckes, as 'a pioneer in cable TV.' The school has in fact built and operated cable systems in Vincennes and three neighboring communities since 1964. However, these are conventional CATV systems which the college runs simply to generate revenues to support an educational UHF station donated to the college in 1961. While the cable-supported ETV station now provides a range of programming from PBS, the Indiana Higher Education Television Service, and the local community, the cable system simply offers '10 different (broadcast) television channels and a weather and temperature channel.' Only now, after eight years of operation, are plans underway to offer 'special local programming' on the cable. (11)

With the exception of pay TV (in all its forms and not just on cable), the Vincennes experience is typical of what most of us know today about our major electronic publishing systems. In these terms, the picture we see is still largely an extension of the early promise

of broadcasting. Broadcasting was the first electronic publishing revolution because it was the first means to distribute fluid voice and image information to broad, even simultaneous, national audiences, a major shift from the print media. Cable TV was once thought to be a second revolution, but it is now clearly only a different repackaging and distribution system for the same or similar program sources. Cable also faces severe competition as it tries to develop new services in a world of changing technology.

The new small format video technology also became known during the early experimentation with cable. This video production equipment was inexpensive and even portable, allowing new experimentation in television programming. Experimentation with this more personal and flexible television technology spawned a new group of independent program makers or videomakers at the semi-professional and professional level. Many of these individuals and groups worked from different cultural, social, and institutional perspectives than the more established editorial systems in broadcasting.

The success of these independent experimentors was marginal in cable, however, and video independents have joined independent producers and filmmakers who are all knocking at the door of broadcasting, cable, and even Congress to find greater receptivity for their work. This is not public access or audience control, however, since independents may bring a different editorial focus or choice to audiences, but still may not respond to many unfulfilled audience needs or interests.

The other side of small format video and other personal technologies is their growing accessibility to an audience and consumer marketplace in ways that change the passive audience relationship to editorial systems,

whatever the source of their programs. Such technologies can allow audiences to manipulate, change, store, or make demands on programming sources for their own entertainment, education, or information needs. This is a revolution of growing proportions, and it is important to review this aspect of electronic publishing technology.

V. PERSONAL TECHNOLOGY - THE SECOND REVOLUTION

The telephone is our best known personal technology. We take the phone so much for granted that we often fail to appreciate what a marvelous personal instrument it is. Vast wired networks and switching systems, terrestrial microwaves and elegant satellites spinning in space can be combined for even the simplest phone call to say, "Hello, Grandma. Happy birthday." We do not consult a "telephone guide" to decide what phone calls to tune in. The phone is only active when we use it, for the particular purpose or design we have for it.

The most distinctive feature of the phone is that it has a personal "address." The telephone number identifies each phone terminal in homes or businesses, allowing information to be switched from a particular phone terminal to another terminal at the bidding of the dial. The address also allows the calls to be billed directly, so that there is a personal consumer marketplace of direct payment for actual communication services.

This personal, individualized, and consumer controlled form of communication technology is now characteristic of a growing number of new technologies in electronic communications. Indeed, many are linked to the personal address and switching capabilities of the phone system,

so that the lines between broadcasting and phone communications are suddenly blurred. As we review this growing list of personal technologies, we shall see that the significance of this marriage is an important component of this second revolution of personal communication technology.

A. Videocassettes and Videodiscs

When radio first began sending voice transmission to our home, it wasn't long before records and tape recorders gave consumers the ability to record, store, and retrieve their own sound libraries. Videocassettes and videodiscs are merely the same capability applied to the audio-visual or TV image.

The videocassette is a tape recorder/player that can record and then play back television or video material. You can record from a TV set or from your own camera and microphone. The cost of these devices is about $600-$1,000, not much different from the cost of a good stereo system, so they are a major consumer item that is already entering the home faster than color television did when it was first introduced. The individual tape cassettes that are used for recordings are the most expensive part. Costs run from $12.00 for a blank to $40 or more for pre-recorded cassettes of movies and other programs. The tapes are re-usable.

The videodisc, on the other hand, is more like a record player than a tape recorder. You cannot use a disc machine to make your own recordings but must order pre-recorded discs. But the disc is a cheap plastic product costing only about $10 for pre-recorded programs making this program "software" competitive with books in terms of cost and storage

capability. Since it is cheap to produce many copies of a program (the cost of materials is only 5% of the total disc price, whereas 90% of the cost of a videotape cassette is of necessity in materials), a wide variety of institutions and industries can justify the cost of making and distributing discs for education, training, or consumer markets.

The disc is also the most resourceful of the electronic publishing devices. A classic book can be recorded on a single videodisc in both the original form and in a movie version. The first one minute of storage space on the disc can be the book; a one hour and 59 minute film of the same book can be recorded on the remaining storage surface. Students can read the book page by page in a single-frame sequence. Then, at their command, the motion picture sequences unfold. Videodiscs can move from print to nonprint at the flip of a switch. (12) Moreover, at a projected cost of $500 per player, these devices are already testing well in the home consumer market.

The sponsor/editor/audience mix criteria begin to change radically with cassette and disc technology. As we began to see in cable, personal technology makes the sponsor role far less relevant. This electronic marketplace of consumer devices and programs is an inventive new environment for editorial and audience access systems. The sponsors are primarily speculative investors interested in the sale of hardware and software (programming) for a profit. They are accountable to their audience both in a consumer marketplace and through the ability of consumers to purchase and manipulate these resources independently.

Cassettes and discs are really electronic books, and they open up a whole new arena of electronic book publishing. At a cost of $10.00-$40.00 for discs and cassettes, you are talking about prices roughly

competitive with hardbound books and record albums. In effect, disc and cassette technologies are transforming electronic media much like the penny-press transformed print. Lowering consumer costs create an accountability to an audience in a consumer marketplace, so that sponsors or patrons are no longer necessary to produce and distribute programs.

As in print, this transition raises the importance of the editorial function--that special aspect of publishing that discovers the kinds of artistic, journalistic, and information sources that can be matched to consumer audience preferences. As the cassette and disc become as common in the home as the stereo set, new and existing publishers will begin to develop cassette and disc libraries on a multitude of topics.

There is now a growing list of video publishers. Time-Life video was one of the earliest and, not surprisingly, it is an extension of Time-Life Books. (Time-Life also owns Home Box Office, the pay TV publisher.) Film distributors such as Universal Studios and Films, Inc., are now exploring the consumer video market. ABC has announced a new subsidiary for video publishing, and public broadcasting is looking at both consumer and instructional markets for its programs. There are now video clubs. The low costs will also permit a variety of corporations, professional groups, and nonprofit, voluntary organizations to experiment. Like the penny-press and print, as markets grow, this new technology will see a thousand flowers bloom.

Not only is the editorial function enriched in this inventive and actual "marketplace of ideas" (the term now begins to fit the process), but the audience role is no longer as passive for three significant reasons. First, the marketplace of ideas is a real one, and suppliers

of software will have to respond to audience preferences with programs and information of actual marketplace value in order to survive. Secondly, with the recording capability of a cassette, users can personally manipulate the timing and use of programs broadcast on the air. Thirdly, with the videodisc, the user can have considerable ability to manipulate the information within a disc, allowing a far greater individualized and sophisticated instructional and training potential for self-directed learning.

In addition to the broad entertainment, information, and learning capabilities of the videocassette and videodisc systems, they are already demonstrating a significant capability to serve the education and training needs of adult workers and professionals. While these machines are only now entering the home consumer marketplace, business and industry are using them widely for their internal information and training needs. Videotape networks are now quite common as a way to distribute training resources among company affiliates and departments. Moreover, since much of the training in the workplace involves the presentation of detailed technical information and data, the storage and retrieval as well as the search and freeze-frame capability of the disc insures a more widespread use of this technology for worker education and training.

Given the potential virtuosity and range of discs and cassettes as a publishing technology, it should come as no surprise that this system meets all five communication needs of working adults admirably, assuming the devices and programs reach a reasonably broad cross-section of consumers and not just affluent professionals. What is unique about this technology is that it meets these needs, like public broadcasting, but

with far more versatility and with a thoroughly selective, individualized, and small audience economy.

B. Black Boxes--Adaptor Technologies

There are now a growing number or extra components of what we shall call "black boxes" that really adapt your present radio or TV receiver to more specialized kinds of information sources. They perform several functions:

Tuners -- We are most familiar with tuners in the form of the channel selection dials on our radio and TV sets. However, standard TV channel selectors, for example, have only 13 channels, while cable systems can offer many more channels to a single home. One black box, therefore, is a separate channel tuner which allows you to choose among a greater number of channels. Such a tuner is often provided as part of your cable fee.

There are also now FM/TV tuners. Since TV sound is actually an FM signal that is far superior to the sound system and speakers in your TV set, the FM/TV tuner is an extra black box that allows you to tune the FM sound from your TV antenna and feed it into your home stereo system. Such a system has stereo potential as public radio and TV go to satellite. Public TV and radio are already pioneering in "simulcasting"--having a public radio station transmit the stereo sound of an opera or other music program shown on public TV. The FM/TV tuner makes this improved, synchronized sound possible within the TV signal itself.

Decoders -- A decoder is another form of extra black box that allows broadcasters or cable systems to transmit a signal that is "scrambled" on the home receiver. You can't unscramble it unless you have a decoder.

This is a way to control distribution. The primary motive is to use an existing "free" transmission signal in a way that people have to pay a decoder fee to use it, or to exclude the material from groups it is not designed for.

"TV for a fee" systems are primary users of the decoder. Pay TV is the word for cable systems that charge an extra fee by sending some of their programs through a decoder. Subscription TV is the word for those who send a scrambled signal on a broadcast station and charge a decoder fee. COMSAT satellite corporation is now proposing to do the same through satellite-to-home transmission of pay TV with decoders. SCA or subcarrier radio is a similar system applied to radio receivers.

Teletext — This is a slightly more sophisticated use of a decoding device. Teletext uses a small portion of a television signal to transmit scrambled "pages" of printed information that can be displayed and read on a TV screen. In addition to the decoder to unscramble the printed pages, teletext adds a keyboard element--a small unit like an electric typewriter or calculator board with number and letter keys. About 50-200 pages are broadcast in short bursts or cycles and the home user punches the keyboard to choose and view a single page at a time. These pages can show weather, time, entertainment schedules, community bulletins, etc. on the home TV screen.

The publishing elements of sponsor/editor/audience are really not relevant to these black box technologies since they are primarily control mechanisms to limit signal distribution. Teletext has some broader implications, particularly in the editorial design of its "pages," but is similar to videotex in our following discussion of personal terminal technologies.

C. Address Terminal Systems

One of the most significant advances in personal technology is to allow the viewer/consumer in electronic media to talk back to and to actually manipulate the information source for his or her own purposes. This is often called interactive communications. Everything we have discussed up until now has been largely passive audience systems, where viewers can only choose among strictly limited and editorially distinct sources of information. These personal, interactive technologies are different forms of terminal devices which introduce to video technology the individualized characteristics of the telephone--the ultimate personal terminal with a personal address. Indeed, these devices are often linked with the telephone terminal, and all of them have the potential of a personal and influential connection to a much larger information universe that allows for consumer-determined choice and discrimination.

These personal terminal devices are usually composed of some combination of several elements: an input element (often a modulator-demodulator or MODEM) which translates the phone, cable, or broadcast information into the language of the terminal; a microprocessor which allows the terminal to manipulate this information; a keyboard element like the keys on a typewriter or calculator which allows the user to give instructions and send signals; and a display element which allows the user to see the results in print or on a TV screen. Anyone who has an electronic calculator is already accustomed to the microprocessor, keyboard, and display combination. The following discussion will demonstrate some of the basic terminal combinations:

Video Address Terminal -- These terminals allow cable subscribers to send information back to the cable system. The QUBE experiment in

Columbus, Ohio, uses such a device. The terminal is a small, hand-held, calculator-like device with a keyboard element that sends signals back to the cable system from each subscriber. This signal is encoded with a personal address so that the individual subscriber terminal can be identified by the cable computer. Subscribers can watch City Council meetings and vote on issues, choose a pay TV program and get personally billed, or participate in surveys. This is not a sophisticated terminal, however, since it has no microprocessor element to allow subscribers to manipulate the information in the cable computer.

Phone Address Terminal --These terminals have an input element that can translate phone signals, so that the microprocessor element can manipulate the incoming and outgoing information. A keyboard allows the user to give instructions and send signals through the microprocessor and phone system to influence the source. A display element also allows the users to see the resulting information or data on their TV screen, video screen, or on a printed page through a teleprinter. The applications of this device involve connecting to a computerized information bank or "data base".

Videotex uses the phone address terminal to connect by phone line to computer data banks and display them on a screen. Unlike teletext, the "pages" of information are not fixed. Using the keyboard and microprocessor, users can search freely among a wide variety of data sources, picking and choosing the kind of information they particularly want. This allows much more information to be stockpiled, since individual users can edit their own material and conduct their own searches. This information is in the form of electronic print, not audio/visual television pictures. The information appears like the airline schedules on

the video screens at airport ticket offices. Indeed, some videotex services provide users with access to plane and other transportation schedules in this form.

Computer-Time Sharing is also possible with the phone address terminal. Since the microprocessor element is the same kind of device used in computers to manipulate "digital bits" of computer data, the terminal user can call by phone to a computer and, with the keyboard, use computer logic to perform operations or calcualtions. Consumer time-sharing systems now allow users to tie in and play video games with a distant computer and display the action on their home TV screen or do home budgeting. Actually, terminal users can potentially use their device to perform any operation a computer service is capable of.

Messaging-- Terminal users can also call in to a computer service and leave their electronically printed message. The computer can then be instructed to call another personal address terminal and deliver the message, or other terminal users can call in and retrieve it.

D. Computer Terminals

Since the above terminals all have in common some form of electronic microprocessor for manipulating the kind of digital information that is consistent with the language and logic of a computer, it is a small extra step to add "memory banks" and "computer program" elements for minicomputer terminals for small business, institutional, or home use. Moreover, it is equally simple to take the many minicomputers now on the market and provide the phone terminal inputs for interactive communication.

The computer "memory" components allow for personalized storage and retrieval systems for data information and permit more sophisticated

applications of computer logic and information handling. The "program" elements allow users to have their own systems of computer logic and strategy in order to meet their specialized needs. Such programs are already common accessories to video games and home mini-computers. Some allow foreign language teaching, financing and inventory systems for home or business, instructional programs, etc. Programs come on "floppy discs" for special units or even audio cassettes for use with tape recorders.

The publishing elements of the above terminal systems are quite distinct. Both the sponsor and editorial functions are marginal, since these technologies mark the first honest triumph of "public access" or audience control. The user is in charge here in a self-directed editorial search for information. The devices and computer program information are provided in an open consumer marketplace of data banks and program software in a pay-as-you-use system of choice and value. Low user fees are now emerging that are comparable to long distance phone and video game software costs. One videotex supplier is now offering users access to data banks at a cost of $1.50 an hour--from video games to plane reservations and entertainment schedules.

Lowering costs are also reflected in the hardware. Address terminals can be obtained for $200-$750, with costs going down in mass production as markets mature. Mini-computer terminals cost from five hundred to several thousand dollars, depending on the sophistication.

In terms of the five categories of communication needs of working adults, terminal systems can provide access to large information systems in all categories. One of the data files that can be explored on the $1.50 per hour videotext system is the New York Times Information Bank

of abstracted newspaper and journal articles. Moreover, these needs are met in the context of sophisticated education, training, and self-directed learning elements. These are interactive systems with the common language of computer logic.

The unique elements of the personal address capability of terminal technology, the microprocessor allowing the user to manipulate the information, and the interactive ability to send this manipulated data or other instructions and information back to the source make these terminal systems not simply another technology, but in fact another kind of distinctive information and learning medium in their own right. It is important to consider some of the implications of this new medium.

There are important editorial and curricular considerations in the design of information and learning services that are appropriate to the electronic and digital format of terminal media. As stated earlier, this information is normally displayed in printed electronic characters on a video or TV screen or through a teleprinter on a paper roll. Given the limitations of the average video screen, only limited "pages" of printed data can be displayed at any one time. Educators and information specialists are only beginning to learn what kinds, sizes, and formats of information are appropriate for such a medium. A British journalist points out some of the issues in this editorial dimension based on his experience with the British videotex system called Prestel:

> . . . The actual process of writing, of picking those 80-90 words, becomes a much larger element of 'writing the story' than it does in conventional journalism, where the bulk of the effort probably goes into collecting the facts, checking the sources, etc. . . .
>
> Crippling though the constraints of Prestel may seem, it has one great advantage, one new toy for the journalist. It is a dynamic medium. Nothing happens until the user presses a button and the user himself chooses where he will go next.

> Or rather, you as an Information Provider provide a set of choices for him. . . . The user can participate in the controversy himself, or have the illusion of doing so.
>
> One thing my experiment convinced me is that Prestel is a brilliant educational medium. Indeed, given the simplication involved, it may even push a journalist working in it towards writing for, say, 6th formers or people in their first year at university rather than the full adult audience. There are already certain scientific programs on Prestel . . . But Prestel's choice element, its mildly interactive nature, make it equally suitable for arts or current affairs material. And here, of course, we have shifted the question from, 'who is going to pay to see it?' to, 'Who is going to pay to put the material up on the screen?' (13)

Employers and educators may put material up on these screens in order to capitalize on the interactive or "feedback" element of these terminal devices. This allows for that critical educational and training element of cognitive feedback, the opportunity to determine the level of understanding, progress, and competence achieved by the individual learner. Instructional and training programs can be designed that do not permit the learner to proceed to the next step until a certain level of mastery has been demonstrated. This allows for greater levels of sophistication in worker education and adult continuing education. Such capabilities also permit more flexibility in certifying and credentialing this education and training experience according to widely accepted standards in education, the professions, and the workplace, while retaining the decentralized, individualized, and dispersed characteristics of self-directed learning. This is a major distinction from learning systems based on one-way broadcast distribution systems.

One of the more advanced forms of terminal systems for learning has been developed by the Control Data Corporation (CDC), with its Plato system for computer assisted instruction. They are developing a wide variety of applications in social development, as well as training and

instructional applications. One application is providing computer assisted resources to the City Venture Corp. in Toledo, Ohio, for the rehabilitation of slum buildings and the training of disadvantaged youth. In St. Paul, Minnesota, CDC is opening 15 business and technology centers devoted to the care and feeding of fledgling entrepreneurs. The centers will provide information services to utilities and other building services that assist in the financing of small businesses and teach how to start and run one.

Plato offers basic English and mathematics training, as well as more advanced courses, through 50 CDC learning centers linked to a central computer. The system is being expanded to 80 centers this year. In addition, some companies, such as American Airlines and United Airlines, use Plato terminals as a low-cost source of preliminary flight-simulator training for their cockpit crews.

CDC is also developing low-cost computer-based training for small companies such as MCP Manufacturing in Dallas. MCP used Plato at a CDC learning center to train secretaries to become bookkeepers and develop "a basic knowledge of accounting." Plato cost only half as much as college courses in bookkeeping and did not lock the employees into an inflexible class schedule. But Plato is an expensive system, with monthly terminal rentals as high as $1,100 per month. This developing market has therefore opened the door to microcomputer manufacturers such as Apple, Inc., and Tandy Corp., who are now adding education and training courses to the libraries for their low-cost minicomputer systems for small business and home consumer markets. "Plato is not cost effective yet in basic education skills, but no one has developed the computer software that CDC has," says John E. Haugo, executive director of the

Minnesota Educational Computing Consortium, which uses 42 Plato terminals and is buying 400 Apple microcomputers. (14)

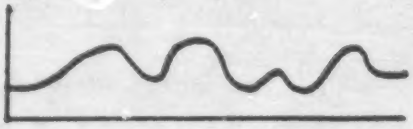
Terminal systems operate with adjustable time frames and learning speeds based on individual needs and applications. Additionally, as such systems mature, the microprocessor and computer logic can be linked to videocassette or videodisc systems, so that audio-visual information can be combined with data systems. Finally, as pointed out earlier, one way of storing and retrieving personal terminal information is on a standard audio cassette recorder. This suggests some basic link between voice, image, and data systems that has not been widely understood before. This is a hint of the third revolution in electronic publishing.

VI. COMMON CARRIER, COMPUTERS, AND COMMUNICATIONS TECHNOLOGY--THE THIRD REVOLUTION IS CALLED TELECOMMUNICATIONS

Why combine a discussion of television and radio broadcasting with personal computer technology? The fact that minicomputers can be connected to videodiscs for certain learning applications hardly justifies the mixture of major fields of technology that have functioned largely as oil and water for decades. However, the blending of voice, image, and data communications into a common telecommunications world is an event of major significance. To understand the meaning of this integration involves a brief explanation of how voice, image, and data signals are transmitted, for it is in the transmission process that these previously distinct technologies are joining hands across an electronic space of great dimensions.

Broadcasting and the telephone used to be similar branches of "voice" transmission technologies. These sound (audio) and picture

(video) signals were translated into an electromagnetic "voice" spectrum or "wave" form for transmission.



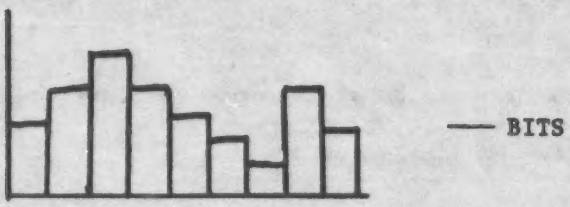
WAVE

It is this wave that is picked up by your antenna or phone line and fed into your TV, radio, or phone receiver. The receiver changes these wave variations back into electromagnetic voice patterns that vibrate your speakers or guide the movement of lines on a TV screen, so you can "see" or "hear" the transmission.

There are two major problems with this waveform transmission. One is that these signals weaken over long distances. That is why there are local stations in radio and TV. Secondly, there are limits to the number of waves you can broadcast in one area without them interfering with each other.

Cable TV and the telephone system use a wire in order to send waveform signals to homes and offices in local communities. The telephone wire can handle the voice wave, but it is not as appropriate for the larger television wave. The cable TV wire has more capacity and can carry not only one television wave but many waves or channels, as many as 25 or more at one time, into its homes.

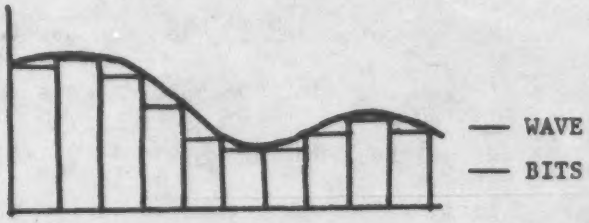
A computer, on the other hand, does not use voice but rather a "digital" form of transmission. Computer data are sent as small "bits" of information in numbered bundles. Computer data are really based on encoded combinations of numbers from 0 to 9. If you use a touch button phone, you can hear the "digit" instructions or "tones" as you dial a number. The telephone or any cable, then, can be used to transmit digital information as well as voice waves. Computers have been talking to each other by phone and cable for a long time.



One advantage of the data or digital bit form of transmission is that, unlike waveforms, they can go long distances without weakening or deteriorating. They are a highly reliable and stable signal form. For this reason, they lend themselves to microwave and satellite distribution over long distances, indeed across vast reaches of space. When NASA is "communicating" with a space vehicle probing Mars, rest assured that the signals and instructions are in digital form.

A. From Waveform to Digital Form--A Marriage Made in Space

One of the great moments of television broadcasting occurred when the first steps were taken on the moon and television gave us all a front row seat. But if a television signal wave loses quality when broadcast beyond the suburbs of a small city, how did television bring us a live picture from space? The answer is partly in the revolutionary breakthrough that allows voice and image waves to be translated into digital bits before being transmitted. The resulting signal has the complexity and versatility of the fluid TV image with the durability and strength of computer bits for transmission across vast spaces.



It is this marriage of transmission technology that is fueling the sudden easy mixture of communication skills and technologies and blurring

the distinctions between voice, image, and data communications. When ABC Nightly News brings you, Peter Jennings live from his desk in London, or when you dial Phoenix from Poughkeepsie for Grandma's happy birthday, voice and TV waves may have been translated into digital bits and spun through webs of satellites in space, microwaves, cables, computer processors, and little copper lines and antennas to the rooftops of American homes, all with the instantaneous speed and virtuosity of a computerized airline ticket reservation. These links and marriages are brought about by the now common digital computer language of voice, image, and data communications.

B. Common Language and Common Carrier

When it comes to sending communication signals, there are two parts to the distribution problem. One involves getting a signal from any one point or locality into the individual home or office. This can be done with an antenna or the "local loop" of a phone or cable wire. The other problem is sending a signal over a long distance from one point or locality to another. This is called point-to-point distribution and is the domain of the "common carrier" technologies.

Long distance telephone lines are common carriers, and they are usually in the form of satellite or microwave transmissions. There are now also other private and specialized common carriers who provide private networks for all forms of voice, image, and data communications. Since voice, image, and data communication can use a common digital language, AT&T and the specialized common carriers are now competing with each other to transmit the varied forms of radio, TV, voice, and computer data signals. It is the growing market in these forms of signal carriage

from point-to-point that Congress and the FCC have begun to deregulate into an open marketplace with less governmental interference.

A lack of interference by government or others in this communications web of telecommunications signals is also a critical social policy matter. These distribution systems or common carriers are also distinctive in that they have no authority or control over the editorial content of the messages and information transmitted. This is a critical division of responsibility since the whole concept of a marketplace of ideas is undermined if these carriers, such as AT&T, could extend their monopoly control over technical distribution systems into the production and editorial control of the messages themselves.

C. Cross-Fertilization in Telecommunications Systems

Partially as a result of the common digital language that common carrier distributors can provide to voice, image, and data systems, international, national, and regional forms of point-to-point signal distribution are resulting in innovative forms of cross-fertilization in these technologies and services. Public broadcasting is now able to distribute its radio and TV programming to its local stations on multiple satellite channels. This satellite ability also allows public stations to form regional networks for programming. "Superstations" are now being created by distributing a local TV station's programming by satellite to cable TV communities all across the country. There are now also "syndication networks" where a program distributor rents his own satellite and common carrier space and distributes directly to his own network of TV stations and cable systems. The Mobil Corporation distributed Edward VII this way. Pay cable programs are also fed by satellite and common carrier

feeds to networks of cable TV systems. The U.S. Post Office has just received permission to use common carriers to distribute mail electronically between post offices for certain categories of mail. A private satellite network system, Satellite Business Systems, offers its network capability to businesses for their private communication needs, pointing out that "In the SBS system, the transmitting earth station will combine voice, data and image signals into digital format and then organize, package, and amplify them for high speed transmission to the satellite." SBS also suggests teleconferencing, or "business conferences across a continent that permit people not only to hear and see each other, but to conveniently transmit the hard copy, visuals and data they may need to work together in a conference situation." (15)

D. The Final Mile--Enlarging the Home Space

With such an inventive and fertile marriage of technologies in a common language and versatile common carrier distribution from Maine to Texas or vast reaches of space, why is our home system largely unchanged except for accessories like video games or cassette machines? Our TV is in the living room, our phone in the kitchen and perhaps a mini-computer in the study. There is more distance between these technologies in the average home than there is in space communication.

The reason is that the common carrier systems are versatile as point-to-point distributors from one locality to another. Once the signal gets to a community, however, there is no comparable universal system to get these signals to the home. The home is still living in an age of separate technologies--the phone line, the cable line, and the broadcast antenna. Once a distant signal is received in a locality,

the "final mile" to the home must pass through one of these local loops.

The broadcast loop through TV and radio antennas is too limited for the kind of extra traffic and channel space needed to handle simultaneous voice, image, and data transmission. You also cannot send signals or give instructions back to the source, so that the address terminal technologies of phone and data systems are useless. The same is true of satellite to home transmission through home satellite receiving dishes.

The phone loop can carry voice and data signals, can handle personal address technology by switching to each home line, and can carry signals back from the home. But the phone line is too narrow for sound home transmission of TV and video images. Moreover, the phone can handle only one channel at a time which shortchanges the multiple choice abundance of telecommunications hardware and software. If your phone line is being used to play a video game with a computer on your home TV, no one can call you. Just imagine the congestion if you tried to watch TV from your phone line.

The local cable TV loop is capable of sending many simultaneous TV and other image channels to each home. It can carry voice and data signals as well, and it can carry signals back from home terminals. However, while broadband cable seems to be the most versatile "final mile" loop, it does not have the switching capacity from channel to channel and home to home that the phone system does to integrate home signals to the point-to-point distribution system of common carrier technology.

Furthermore, the greatest barrier to broadband cable is its seeming inability to build a truly national system or "wired nation" with their heavy copper wire limitations. Rural areas are too thinly populated to support cable costs. Major cities are prohibitively expensive since cables must be fed underground instead of on telephone poles, and the cabling of the entire nation would be an enormous capital outlay that the spotty record of cable entrepreneurs could hardly attract in present money markets.

E. Fiber Optics and the Final Mile

All of the above local loops fall short in some major way of providing the kind of integrated home link to the point-to-point transmission systems. However, the world of technological innovation has not failed us here. It appears that the development of fiber optic technology can solve these problems with a local glass fiber loop. Fiber optics are like copper phone and TV cables, except they are woven of tiny glass fibers that carry laser light beams. These fibers can carry many channels and can be switched like a phone loop to carry signals from one local address to another. The fibers transmit signals by means of a laser beam that emits bursts or pulses containing the digital information or common language of voice, image, and data transmission.

Who will build the local fiber optic home transmission systems? New companies could do so, but cable TV companies argue that they already know how to wire communities to multi-channel distribution links. However, AT&T points out that cable lacks the kind of switching capacity that links these local loops to the home to other localities in point-to-point systems, as in the already developed long distance telephone and

digital transmission systems. Moreover, AT&T could build a national system by systematically replacing its local copper lines and switches with fiber optic devices. Additionally, given the immense capital costs of eventually providing local, switchable, addressable, multi-channel fiber optic loops to most homes and offices, AT&T has the expertise, equity, and confidence of the financial market to command the necessary billions. Finally, AT&T is familiar with managing private and personal communications links as a common carrier even to the home, remaining divorced from editorial authority or responsibility for the content of the transmission.

Clearly, as the many facets of the telecommunications system began to emerge through technological innovation and expanding markets, AT&T looked over at the television networks, the computer networks, the satellite networks--the common language marriage of voice, image, and data communication--and smiled. The result was the "Bell Bill," AT&T's challenge to Congress to resolve the problems of regulation built on assumptions of scarcity, separate technologies, and lack of marketplace competition that are no longer appropriate. Congress responded with the attempt to rewrite the Communications Act of 1934 and began a pronounced tilt toward deregulation, particularly in the data communication field. As deregulation thrusts moved into the isolated and protected environment of broadcasting by radio and TV, conflicts arose over claims on both sides of public vs. corporate interests that must be the function of government regulation. Before addressing some of these larger social policy questions, we should visit one last element of the integration of separate technologies into the common language of telecommunications.

VII. THE INTEGRATED VIDEO COMPONENT

It should now be clear from the foregoing analysis that not only are inventive and resourceful technologies combining to form a sophisticated telecommunications system linked to cosumer needs and preferences, but several distinct industries are beginning to merge their talents and resources to support this marketplace of ideas. Over the next ten years, this information system will become a billion dollar industry and bring about major changes and new linkages among the publishing, consumer electronics, broadcasting, and telecommunications industries under the common banner of electronic publishing.

Moreover, if we can bring together voice, image, and data communications in distribution and production technologies and into the home loop or final mile to the consumer's door, can we also bring together the voice, image, and data flows in a common home device? Can we combine the broadcast receiver with the personal address terminal? It should come as no surprise that the Integrated Video Terminal for home use is already in the development stages.

It is important to recall that the common element of transmission for voice, image, and data systems is the language of digital bits from computer technology and that the common element of most personal technology and terminals is the microprocessor element--the logical nerve center common to computers, advanced calculators,and even electric typewriters that can manipulate digital bits of data according to user commands from calculator-like or typewriter-like keyboards. The integrated video component is a microprocessor device capable of integrating voice, image, and data communications in the home.

According to a recent study by International Resource Development, Inc., the trend of integration is moving toward an Integrated Video Terminal (IVT) which will perform the functions of telephoning, television display, video tape recording and storage, hard copy printing, and home computing. It will be headquartered in the kitchen of affluent homes (sometimes called the IBM Executive House) and will be an operating tool in the administration of the home, its appliances, environment, bookkeeping, planning, and control. The IVT will serve as the primary home tool for: entertainment; publishing access; home environment scheduling; administration; home appliances control; self-education; correspondence; personal interface; and ordering and paying transactions. The basic IVT is expected to be introduced in 1982 with a price of $1,400. More elaborate models are expected to be built into new homes with costs and forms of financing equivalent to purchasing the family car.

The IRD report concludes:

> The eventual impact of the IVT on housing patterns, manners and morals, and the economy in general will be as great as the impacts of the automobile, television, and the national highway system. The pattern of distributed living, emancipated from geography, created suburbia. The telephone network is the nervous system that holds this distributed social organism together. Distributed living, distributed mobility, and distributed interpersonal communications support and feed on each other. The IVT will further this process, which will extend it to all social levels as the IVT spreads.
>
> The IVT is interactive, and responds to initiative. Program material is selectable. Broadcasting will yield to narrowcasting. Simultaneity of audience will be reserved for news, special events, sports, and the most attractive of programming. Most programming will be self-scheduled by VTR from a weekly menu, and from video-response libraries for a fee. Publishing for IVT's and videotape recorders is expected to become a billion-dollar industry by the mid-1980's.

> Self-education, even in the entertainment media, will be the mode of operation. The three year old who passively absorbs video fare today will become a stimulated interactant, selecting his own material. The ability to be active rather than passive will have a profoundly beneficial impact on manners, morals, and initiative. TV will become intellectually uplifting and a motivation to make inquiries and initiate learning.
>
> . . . The greatest long term impact will be from the self-improvement and self-learning capacities of the IVT. As these are integrated with degree-granting administrations, self-taught and home-tested certification will become the norm for postgraduate adult education. Adaptability to changing labor markets will become a matter of self-initiative, with an easing of social stress.
>
> . . . An oligopoly of IVT sourcing will arise, matching the automobile industry in resources, economic impact, and financial revenue. The winners in the race for this eventual giant industry position will probably not be the present home computer manufacturers. The best posture is held by the vertically integrated companies with solid state computer, and consumer manufacturing and sales experience. Companies like Texas Instruments and IBM and AT&T's daughter fragments will be likely candidates. (16)

Clearly, the Integrated Video Component and its inevitable electronic brethren will bring the three revolutions in communications technology--from broadcasting to personal technologies to the common carrier transmission links between them--full circle in an integrated, fully accessible, highly maniulable, and consumer oriented marketplace of ideas. In our final section, we will distill from this complex technological arena a series of distinct social policy issues of importance to the public interest in the development of these electronic publishing resources for maximum public benefit.

VIII. SOCIAL POLICY ISSUES

In spite of the range, complexity, and virtuosity of a growing number of technological devices, the electronic publishing system of

telecommunications is beginning to develop a series of common institutional and social policy issues that affect public needs and interests. In this final section, we will outline these issues and raise some of the critical public policy questions that are coming to the forefront.

A. Market or Mandate--The Deregulation Issue

The growth of the electronic publishing industry raises two fundamental arguments on behalf of deregulating or reducing governmental mandate and oversight in the telecommunications environment. One argument is that present regulations are based on assumptions and restrictions that artificially separate and protect elements of these industries--for example, the regulatory protection of broadcasting against the unregulated flow of data processing communication. The agrument on behalf of deregulation rests on a belief that the lines between voice, image, and data communications are now blurred in a highly sophisticated marketplace where open competition would be a greater incentive to development and technological innovation. Congressional actions increasingly conform to this view.

The National Telecommunications and Information Administration (NTIA) is the Executive office under the President for communications policy. In keeping with recent goals of increasing industrial efficiency and innovation through deregulation, NTIA has a strong commitment to the goal of terminal equipment deregulation. NTIA believes that AT&T must be allowed to participate in such markets, but that this participation must be developed in a way that insures full and fair competition.

Our analysis has shown that lucrative new markets, as well as technical imperatives, have drawn the data processing and communications

industries into confrontation. AT&T has asked the Federal Communications Commission to implement its Advance Communications Service, Bell's major entry into the data processing field. Common carrier communications have been regulated, while data processing and data communications (operating in a competitive environment) have not. Therefore, the FCC has launched a second inquiry to find the proper dividing line between computing and communications.

As information networking progresses, pervasiveness of service will be the key to success, and the telephone companies are already everywhere. IBM, Xerox, GTE, and the U.S. Postal Service (electronic mail) are among the competitors for the communications market. The tide of deregulation and procompetition is currently on the rise, but if unforeseen concentration occurs as the information age progresses, with AT&T too much in control, the tide toward deregulation may be stemmed. Present Congressional strategy involves a focus on AT&T's conduct rather than regulating its structure--forcing "arm's length" dealings between AT&T's phone monopoly and its subsidiary companies (such as Western Electric) in the data, terminal equipment, and satellite networking fields. The purpose is to prevent AT&T from using its phone revenues to subsidize these activities and compete unfairly against other companies and carriers.

Where one major thrust of deregulation involves fueling competition and innovation in a now diversified marketplace, the second thrust involves removing public interest regulatory requirements that were justified on the basis of "scarcity" of spectrum in delivering services to audiences. Since TV, radio, and cable TV are now flowing into broadly dispersed distribution and reception technologies, is it wise to regulate

their separation? Furtheremore, is it wise for government to act as a surrogate for the public, using regulation to try and wring diversity from each limited technology? Would an open market of multifaceted service and delivery technologies be of more long term public benefit?

If there are more services, more alternatives and more choices in a consumer oriented market, the public interest can become a function of market choice and not government mandate. In such an environment, the cost of regulatory compliance might better be spent for technological development and innovation. This is the kind of thinking that has led the NTIA and Congress to suggest the current deregulation of radio followed by deregulation of television broadcasting in ten years, as new telecommunications development matures in the marketplace.

B. Information as a Product--Social Equity in a Marketplace of Ideas

To date, most of radio and TV has been free as a consequence of sponsorship by advertisers, government, or private funders. However, we have demonstrated that the development of subscriber supported cable, pay TV in all its forms, and personal home technology will place programming and information software in a product marketplace. Will this shift to electronic publishing systems with a real "marketplace of ideas" give too many resources to affluent, professional constituencies and limit the information access of the less affluent? Will market software pull the best programming from "free" commercial and public networks?

"Live from Lincoln Center," for example, has been a program of appeal to blue collar and minority as well as affluent audiences on public broadcasting. However, the Lincoln Center is making plans to distribute their material on pay TV to paying audiences only, a potentially

valuable contribution to the arts economy, but a loss to those viewers without access to pay systems. Furthermore, there are growing marketplace forces to shift major sports events (among the best and most appreciated of commercial TV programs) to pay TV systems.

Given these pressures and the soon-to-be insatiable demands of video cassette and disc publishers, will the economics of program and information software approximate book, magazine, and other print publishing to allow a reasonable range of access by a broad public? Will there be social equity in access to the marketplace of ideas?

C. Editorial Systems

One major purpose of this paper has been to emphasize the importance of editorial judgment in determining the public interest focus or value of a communications publishing resource. In this new electronic publishing system of telecommunications, what kind of systems will focus on packaging the best of creative programming and information talents or sources to fulfill the many needs of a diverse public? Cable television has already been a disappointment, compared to its early promise, by its function of repackaging existing broadcast and syndicated programs and contributing little original material. As great as the promise of videocassette and disc distribution seems to be, many suppliers are doing little more than recycling old movies and TV shows with no editorial originality.

Additionally, in terms of social equity in this new information product marketplace, it may be necessary to transform Public Broadcasting into a Public Telecommunications system with an editorial focus on unmet information needs of audiences, regardless of their ability to pay. To do so, a Public Telecommunications system must be able to compete in

software and talent marketplaces to be sure broad interests of the public are served, particularly elements of less affluent audiences unable to afford personal technology and software. Public Broadcasting (or telecommunications) may not be wise if it continues to play to affluent galleries, given the long term competition for that same dollar by private sources and the larger editorial need of the entire American audience.

A further consideration in terms of the editorial function is the development of program innovation and experimentation. The chemistry of the editorial function involves bringing together creative talent, journalistic talent, and information resources with the multi-faceted kaleidoscope of audience needs and interests. An enormous marketplace is being generated for this program software. However, there are few inventive, original, and editorially distinct sources of such programming that are willing to take the risks necessary to explore the full range of communication interests of American audiences.

Sources of mass entertainment and computer program software are well developed. However, the range of specialized program audience software needed for videodiscs, cassettes, pay TV, programmed instruction, etc., has too few sources. There is an enormous need and potential for developing new talent pools for program innovation in new and distinct institutional settings. In this context, there is a special need for centers with accountability to the programming needs of an audience as opposed to the more limited ranges of sponsor-supported preferences. To support such centers, there is a need to develop the economics of aggregating or concentrating the program funds available from the consumer marketplace to support innovative programming centers.

Lastly, editorial judgment on behalf of public information needs must continue to be protected from government influence under standards of First Amendment autonomy. Care must be taken that editorial integrity is maintained within large corporate communications structures as well as other forms of private and public communication enterprise. Additionally, if it is necessary to provide significant government funding to develop Public Broadcasting into a Public Telecommunications system, editorial integrity must be maintained without stepping to the tune of government orthodoxy or the shifting political will of the moment. In the editorial management of artistic, journalistic, and information sources on behalf of an audience, we must never forget that a free and original creative voice is also a public voice, and this voice must be free in a telecommunications publishing system, or the larger public interest of an open marketplace of ideas cannot be realized.

D. Networks

As we have shown, the cross-fertilization of distribution and reception technology allows for great innovation in forming new and distinctive program networks both within and distinct from individual technologies. Such fluid network formation and experimentation needs to be fostered, for it helps to break down the clumsy proprietary walls between information technologies that create artificial roadblocks between audiences and potential information sources.

Independent producers and program syndicators are already learning to bypass the ABC, NBC, CBS, and PBS national networks to form their own program networks for willing and distinct local cable systems and TV and radio stations. Private satellite networks link business and industries,

and the Public Service Satellite Consortium is developing similar networking among nonprofit, voluntary, and educational institutions for voice, image, and data communications. The Post Office now has clearance to develop limited electronic mail networks between post offices. Home terminals can be linked for "messaging" and other forms of terminal interaction.

Another important offshoot of more decentralized and fluid forms of networking is its impact on the use of advertising in supporting consumer interest programming. A recent N.Y. Times article commented on this force in cable TV: "Cable programmers hope to profit in much the same way special-interest magazine publishers and radio programmers have in recent years by precisely targeting a well-defined fraction of the population which certain advertisers hope to reach exclusively." (17)

The combination of videodisc and videocassette alternatives with specialized network possibilities could help to dilute the dominance of broadcasting's advertiser-sponsored networks. Advertisers could have a more magazine-like relationship to many specialized program networks. This could in turn provide more competition for and experimentation with the advertising dollar as a support mechanism for audience information needs in electronic publishing.

E. Learning Centers

There is a growing need for inventive experimentation in ways to combine and utilize personal technologies and telecommunciations systems for continuing education, adult problem solving, and lifelong learning applications. There is, in effect, a critical and expanding role for public libraries and community centers; universities; community colleges;

and public and private voluntary organizations to develop innovative learning centers as access points to this new technology and its distribution and software networks. These centers could be essential in lessening the impact of the shift to an information product economy on the less affluent. Community-based learning centers--a kind of electronic folk school--can provide access to these resources under a variety of institutional umbrellas.

1. Learning Centers as Brokers for Information and Education

The integrated nature of expanding telecommunications technology spawns a concept of a learning center that is responsive directly to a broad context of learning and information needs rather than functioning within narrow institutional or curricular environments or any single technology. William C. Norris, founder of the Plato computer system, speaks of this kind of integration:

> The type of system that looks most workable is basically a national and international network of learning centers. In the U.S., for example, there will be a number of independently owned networks--in some respects not unlike the TV networks of today. On a local basis . . . this would probably include the use of cable television and microwave. On a national and international basis, satellite communication will be involved.
>
> The system is computer-controlled and the main method of delivery is computer-aided instruction with integrated terminal subsystems which include videodiscs, audio input and output, and touch input. Structured computer conferences of up to 40 students can be held, or a single student can interact with another student or instructor as desired. The key to this system will be computer-aided and computer-managed instruction, but other types of media will be offered as appropriate.
>
> . . . [Such a system] is applicable to any information-based or knowledge-based service involving exchange of facts and/or their modification. It can be used one-to-one, like a telephone, or one-to-many, like radio or TV. . . . With audio and visual, it is a communication system with a virtually inexhaustible memory and the ability to exercise agreed-upon

> logic. It is profound, transportable, lasting, dependable. It works 24 hours a day, seven days a week. It costs less and less each generation. And it can be consistently excellent. (18)

Such learning center networks can vary widely in their scope, range of service, and type of constituency served. Many can arise from cooperative efforts of business, government, and educational institutions. Libraries and community centers can be important candidates for such services with local, state, and Federal support, as a way of insuring free public access to some essential services in a growing marketplace of information and education products or services. In this regard, many public broadcasting centers are now expanding to the concept of a "telecommunications center," with linkages to a broad range of educational institutions and cooperative communications services. One such system is the West Central Illinois Educational Telecommunications Corporation, also known as Convocom. This consortium of community-licensed television stations and educational institutions is arranging a multi-faceted production and distribution system employing television, radio, common carrier microwave, cable TV, and videocassette systems. Convocom is funded by diverse private and public sources and employs a regional design with extensive public/private sharing of production and distribution resources. It has also established a public nonprofit planning, coordinating, and administrative structure to orchestrate these resources.

2. Tutorial and Support Services for Learning Systems

Another important aspect of the design of learning center resources is the provision for teacher-based tutorial support and the development of accessory course materials to aid the self-directed student in the

home or learning center environment. Britain's Open University, while designed primarily as a form of instructional television broadcasting to learners in homes and schools, has developed such a support mechanism. Students can regularly attend one of the 284 Study Centers which have been established throughout the United Kingdom. All of them are equipped for the direct reception and tape recording of both radio and TV media. Centers in areas of poor reception hold libraries of all television programs transmitted and other centers may borrow copies from the regional headquarters.

However, the Study Centers are more than broadcast receiving centers. Organized in twelve regions, they provide the basis for personal tutorial services to students and the framework for their life as undergraduates. A locally based tutor or counselor is available at each of the study centers on specific evenings of every week, and students may ask for a personal interview.

Such support services are essential. While studies have shown that self-directed or "auto-tutorial" learning can be a highly effective form of teaching, particularly with the cognitive feedback elements of computer-aided instruction, studies also confirm that provisions for personal interaction with teachers and peers as well as accessory tutorial and print services greatly enhance the levels of student achievement and satisfaction.

Program and curricular innovation must also be an essential component of these learning and information systems. William Norris points out this critical area of research and development within the learning center concept:

> If you are not familiar with the term "courseware," you could think of it as curriculum materials in all media forms, including computer programs. The courseware must be of the highest quality. Cooperative efforts between the networks and either individual authors or author teams, as well as cooperative projects with educational institutions worldwide, will insure that quality is achieved. No one should underestimate the cost of high-quality courseware. The investment in individual courses will be up to $1 million or more for each network. Therefore the ability to deliver to a large segment of the population is necessary to insure a reasonable return on this investment. (19)

Funding mechanisms must also be developed for learning and information centers and networks. In this regard, it is important to note that a wide variety of funding sources readily exist and do not have to be created in terms of new educational or communication policy. Local, state, and Federal educational budgets can be adapted readily to include voice, image, and data software within the same budget constraints as support for curriculum materials in print. Costs and publishing concepts of design and distribution for those resources are now similar to the print side of the education and information industries. Moreover, Congress has recently declared that funds normally available to support the development of public broadcasting stations can now be made available to "public telecommunications entities" that may pursue other forms of communication technology. This provides one source of direct funding for nonprofit, public service, and educational learning centers, in addition to those that can be created around established learning and training marketplaces in education and industry.

Finally, as learning and training systems become more decentralized and dispersed--particularly as they attempt to reach working adults through means of non-traditional and self-directed study--mechanisms for the certification and credentialing of learner achievement must be more

broadly developed. Linkages to credit and degree granting universities, schools, and community colleges must be established, as well as links to professional societies, unions, and trade organizations that can certify the mastery of job related skills for business, industry, and the professions.

F. Ownership, Concentration, and Control

While it is important to recognize when marketplace forces operate competitively and innovatively to support the public interest as a function of consumer determined value and choice (and it appears that many aspects of electronic publishing meet these criteria), it is also important to recognize potential dangers and abuses in such marketplaces. The potential for abusive concentration, monopoly, and anti-competitive practices is clearly evident in the telecommunications industry. Issues of anti-trust and monopoly concentration underly much of the caution of Congress in allowing AT&T to diversify its role in this marketplace.

There is also the matter of preserving the very diversity inherent in the decentralized fabric of new communications devices and systems. How are thse characteristics affected if major corporate conglomerates and oligopolies own and control large portions of these technologies? Present regulations are already concerned with this point; no single corporation can own more than seven television stations. Morevoer, recent court rulings affirm FCC prohibitions against the ownership of a TV (or radio) and newspaper in the same market (although existing combinations can remain).

Even within such constraints, large media conglomerates are easily formed. The recent merger of Gannett Corporation with Combined

Communications Corporation resulted in a company that owns 80 daily newspapers; seven television stations; six AM and six FM radio stations; outdoor advertising; as well as weekly newspapers; Canadian newsprint interests; a news service; and Louis Harris and Associates polling firm. Criticism has been levelled at Gannett by members of the journalistic community and media critics for developing a profit oriented corporate entity with little regard for the editorial integrity, local editorial autonomy, and local diversity essential to a sound publishing enterprise.

Apparently stung by the criticism, and concerned about FCC review of this largest merger in media history, Gannett has been running full page ads in magazines and newspapers pointing out the freedom of local publishing enterprises under their umbrella. Gannett says in its ads that:

> . . . each (newspaper) operates under Gannett's policy of editorial autonomy. Local editors and publishers are responsible for the content of their newspapers. . . . And so from Wilmington to Denver, from Cincinnati to San Bernardino, every Gannett newspaper is free to express its own opinions, free to serve its community in its own way.

Some of this anxiety also stems from concern over recent court actions which question whether First Amendment protection should be automatically extended to media conglomerates, if their corporate activities do not promote or support editorial integrity and autonomy. Chief Justice Burger has suggested a reinterpretation of First Amendment protections in light of "the evolution of traditional newspapers into modern corporate conglomerates in which the daily dissemination of news by print is no longer the major part of the enterprise." (20)

The courts are also less responsive to arguments that the First Amendment precludes actions to break up media concentration, feeling

that freedom of the press is meant to protect the content (or editorial function) and not the ownership of the media. As multiple ownership by conglomerates and oligopolies of multi-media technology continues to expand, this editorial issue of concentration will remain. John B. Oakes, former editorial page editor of the N.Y. Times, recently voiced his concern about the growing public perception of press conglomerates, replete with built-in conflicts of interest:

> I think this perception may lead to a questioning of the need for a special protection of the press as such, under a First Amendment that was in fact designed to insure the free flow of information and opinion, and not the accretion of corporate power. . . . While many chains operate in such a way as to leave editorial independence in the hands of individual components . . . the potential threat of centralized, remote control, of concentrated economic and editorial power is always there. (21)

This same issue of concentration underlies anxiety about AT&T and other common carriers who are the vital transmission links for electronic publishing. Should they be allowed to enter into programming and editorial ventures in addition to their reach in the hardware and dissemination fields?

A final issue in terms of media concentration is that the decentralized economy of electronic publishing does not in fact require corporate concentration and integration in most cases. There is, in fact, an opportunity to encourage minorities and women as well as geographic and cultural diversity in the ownership and control of electronic publishing ventures. In this regard, there is another aspect of editorial autonomy to consider, that is, not only the editorial integrity of program decision-making for an audience, but the freedom of media systems as autonomous institutions to editorialize and to express partisan or controversial views freely.

Electronic publishers, like print publishers, join the free speech tradition of the Fourth Estate, the publishing industry and free press as a private and autonomous voice and countervailing power to government. In other words, publishing institutions are, as a matter of principle, free to act independently and privately, as John Oakes also makes clear:

> . . . the First Amendment . . . was couched in vague but negative terms, that 'Congress shall make no law . . . abridging the freedom . . . of the press. . . .' It carried with it no guarantee that publishers and editors would act responsibly or with restraint, no guarantee even that the press would be a free marketplace for ideas and opinions or a forum for debate. (22)

Communication entities in both electronic and print publishing not only have the freedom and power to edit information on behalf of an audience within their system but are private, autonomous, economic and institutional forces in their own right. This is why it is important that not only the content but the ownership of electronic media reflect a diversity of American communities, cultures, groups, and interests. Minorities are right, therefore, when they argue that they are not included in a communications system simply because minority programs are published; they want and should have their own stations, networks, etc., if they are to be full partners in the electronic Fourth Estate.

G. Copyright--The Rights of Creative Labor

It is essential to protect the rights of creative labor in this new electronic dissemination marketplace. The equivalent of copyright protections in the print and record industries must be developed in the voice, image, and data publishing systems of telecommunications. Congress has already acted to solve the "Reader's Digest" problem in cable TV, since it is essentially repackaging creative products from broadcast and

syndication markets. Cable must now pay a percentage of its income to a copyright pool to reimburse artists and producers for the value of their work.

The courts are also presently considering challenges to consumer use of videocassette recorders to tape programs from a TV for later use, when the copyright fee was only paid for that broadcast. While it is unlikely that the courts could limit private in-home use, program syndicators and distributors are trying to develop monitoring and copyright reimbursement systems to insure that off-air taping used for schools or other educational or commercial applications is reimbursed.

Program syndicators, producers, distributors, and artists are also concerned about the phenomenon of "superstations" sending local broadcast programming by satellites to other communities. Copyright fees have only been paid for the original market, and the same syndicated material may have been bought in one of the distant markets that gets the superstation feed. Such duplication undermines the value of the creative product in that market and threatens the rights of creative labor to reimbursement and control over fair use of their work. The NTIA and Congress are presently considering requiring "retransmission consent" or advance clearance from affected parties (including the station whose programming is being exported) before distant signals can be sent by cable or other networks.

However, most program syndicators affected by superstations are few in number--primarily major Hollywood film and TV studios. In addressing the concern for copyright protection, there can be a problem of over-protecting severe concentration at the creative end of program production.

At a time when the demand for more and more program sources and products is expanding greatly, such narrow protection could over-protect a small number of producers and studios at the expense of more consumer choice and a broader distribution of marketplace benefits to the larger community of creative talent.

Copyright protection is essential, but approaches must allow for a period of experimentation so that copyright and consent agreements enhance development of new economic systems and reimbursement systems that wed the products of a wide range of creative labor with an editorial accountability to unfulfilled audience interests. Such strategies can be linked to developing talent pools for program innovation and new dissemination networks rather than simply protecting the present few major program producers and syndicators from competition.

H. Component Integration and Standardization

Radios, record players, and tape decks were originally developed and bought separately. However, component systems were developed so that the consumers could mix and match a variety of resources for their home stereo systems at preferred price, quality, features, etc. Now we have videocassettes, discs, decoders, cable tuners, video games, home computers, and address terminals all knocking separately at the consumer's door. The Integrated Video Component shows that all of these components can be linked with common microprocessor and digital technology. Yet, short of the single expensive, integrated component, who will develop a combination of audio, video, computer, and terminal components that consumers can mix and match to tailor their own service mix, price range, etc.?

I. Privacy

A final policy consideration raises the issue of privacy in terms of electronic publishing. If the universe of voice, image, and data communications can come together in the individual home and workplace; if vast data and software sources can be manipulated in the home or office and choices made and business transacted with remote terminals, how will this private use of personal technology for the conduct of personal affairs remain private? What electronic and regulatory safeguards must be in place to be sure that in expanding our universe in a marketplace of ideas we can protect the private nature of our lives, our affairs, and our needs?

IX. TELECOMMUNICATIONS PUBLISHING

The foregoing analysis of communication technology demonstrates that three major developments are now coming together to create a diverse system of electronic publishing, a system which combines and indeed rivals the virtuosity and range of print media in its ability to serve public communication needs. Broadcasting was the first electronic system to develop extensive distribution networks to send fluid voices and images to broad, even simultaneous, mass audiences. Such systems became primarily commercial, however, and their program software is not a consumer product in an inventive marketplace of ideas for active and selective viewers or listeners, but rather a byproduct of sponsor demands for mass advertising audiences.

As this broadcast model emerged, the Federal government developed a concept of regulation that defended the public interest and acted as a

surrogate for passive audiences. This regulation was justified because the broadcast airwaves were scarce and government could act to insure that greater diversity was possible through regulatory requirements. Channel space was also set aside for non-profit, noncommercial, and educational alternatives.

Paralleling this development of broadcasting and its extension through cable television technologies was the growing marriage of voice, image, and data transmission systems in common carrier networks between localities and indeed by satellite through vast reaches of space. As this integration (and the common language of digital communication spawned by the computer industry) has evolved, the logic behind government mandates that regulate artificial distinctions between computing and communications, between common carriers and data processing, and between broadcast systems and the new cable and personal technologies is open to question.

As this integration of voice, image, and data communications moves into the home and places of work, personal technologies are beginning to mimic and to piggyback upon the personal address and switching capability of the interactive telephone terminal. Here again, the links of computerized data processing systems with the voice and image systems common to the phone, TV, and radio are strengthened by the microprocessor technologies. Microprocessing is the computer-like element that allows users to not only manipulate information they receive but to send back instructions and demands that influence the source or information provider. The passive audience of broadcasting is suddenly not only active, but interactive, and making choices and demands in information marketplaces of program software and services. Videocassettes, discs, address

terminals, and minicomputers are the penny presses of electronic publishing. These personal devices are bringing audiences out of passive, sponsor-dominated communication systems into a world where information is a product in a genuine marketplace of ideas fueled by consumer dollars, choices, and demands.

In such an expanding consumer marketplace, our approach to obtaining program software for entertainment and information, or courseware for instruction, job-related training, and lifelong learning, are much more in the book-like, magazine-like and newsletter-like traditions of publishing. Such electronic publishing systems are therefore much less like the pervasive mass audience systems fostered by commercial broadcasting. This print-like evolution of electronic publishing also moves some regulatory concepts of government intervention further back behind the gate of First Amendment protections for creative, journalistic, and educational information systems.

This same orientation to broad publishing models of communication services is also fostering new and innovative linkages between the publishing, consumer electronics, broadcasting, education, and telecommunications industries. As our discussion of policy issues indicates, such cooperative links are reducing the commitment to corporate and institutional designs built around separate technologies--as information producers, networks, editorial systems, and learning centers begin to move freely across the fluid boundaries between voice, image, and data technologies.

However, while growing information marketplaces and services reduce the need for regulatory initiatives which attempt to wring diversity out of narrow and separate technologies, there are still major questions

confronting us as a matter of government and social policy. As information services compete for the consumer interest, consumer dollar, and sources of program development, it is essential to insure that access to information products and services reach all levels of the population and not just affluent professionals.

Furthermore, abuses of concentration, ownership, and control can easily undermine the promise of a diversified marketplace of ideas inherent in the broad system of telecommunications publishing. Such abuse can also deny access by cultural, racial, social, and intellectual minorities to the ownership and control of program development and distribution systems that serve their unique needs. Finally, program innovation in all its forms becomes a far more essential enterprise in fulfilling the kaleidoscopic and exhaustive needs of the public for entertainment, information, and learning.

However, the problems and limitations seem to be outweighed by the growing potential and resourcefulness of a wide-ranging telecommunications publishing system. The marriage of a vast array of technologies and institutional resources in a growing information marketplace seems to be drawing us closer to that cherished concept of a genuine marketplace of ideas. Such an inventive and publicly accountable marketplace can connect the best of creative, journalistic, and information resources with the needs of the public in the daily process of working, learning, and living.

REFERENCES

1. Garrison v. Louisiana, 379 U.S. 64, 74-75, (1964).

2. Norris, W., "Via Technology to a New Era in Education," Phi Delta Kappan, February 1977, p. 452.

3. Adler, R., Baer, S., Aspen Notebook, Cable and Continuing Education, Praeger Publishers, New York, 1973, p. 15.

4. Charner, I., "Worker's Educational Benefits: An Exploration into the Non-Use of Tuition-Aid Programs," National Manpower Institute, Washington, D.C., 1979.

5. Lane, M., "Shapers of Knowledge: The Editor in Book Publishing," Annals of the American Academy, p. 35.

6. Broadcasting, June 5, 1978, p. 31.

7. Red Lion Broadcasting Co., Inc., et al. v. Federal Communications Commission et al., 395 U.S. 367, June 9, 1969.

8. Oakes, J. B., "Frank E. Gannett Memorial Lecture," The Washington Journalism Center, Washington, D.C., May 17, 1968, p. 3.

9. Red Lion, p. 390.

10. Halberstam, D., The Powers That Be, Alfred E. Knopf, New York, 1979, p. 734.

11. Aspen Notebook, p. 49.

12. Wood, K. R., Stephens, K. G., "An Educators Guide to Videodisc Technology," Phi Delta Kappan, February 1977, p. 466.

13. Bygrave, M., "Writing on an Empty Screen," InterMedia, May 1979, pp. 27-28.

14. "Computers: A Social Strategy Aimed at Profits," Business Week, June 25, 1979, p. 119.

15. "Toward Better Management of Large Organizations," Satellite Business Systems, McLean Virginia, pp. 2-3.

16. "Home Terminals to Revolutionize Publishing Industry," Information Hotline, December 1978, pp. 10-11.

17. Funt, P., "Tomorrow--'A Video Supermarket,'" New York Times, July 22, 1979, p. 29.

18. Norris, p. 451.

19. Ibid., p. 452.

20. Oakes, p. 4.

21. Ibid., p. 4.

22. Ibid., p. 2.

The National Institute for Work and Learning (formerly the National Manpower Institute) is a private, not-for-profit, policy research and demonstration organization established in Washington, D.C. in 1971. NIWL is concerned with encouraging public and private sector policies and practices that contribute to the "fullest and best use of the life experience"; with eliminating artificial time-traps which segment life into youth for schooling, adulthood for working, and the rest of life for obsolescence; and with a more rational integration of education, employment and training, and economic policy.

The officers of the National Institute for Work and Learning are:

Willard Wirtz, Chairman, Board of Trustees
Archie E. Lapointe, President
Paul E. Barton, Vice President for Planning and Policy Development

Worker Education and Training Policies Project staff include:

Gregory B. Smith, Project Director
Ivan Charner, Director of Research
Jane Shore, Policy Research Associate
Vivian Lee, Executive Secretary
Shirley Faye Epps, Project Secretary
Jamshid Momeni, Research Associate
Edward Cohen-Rosenthal, Project Officer
Francis Macy, Project Consultant
Julia French, Research Librarian

Dr. Herbert Levine, Director of the Labor Education Center at Rutgers University has assisted NIWL on this project as Senior Study Consultant. The project has been advised and informed as well by a National Advisory Committee of representatives from companies, unions, and education institutions.

Nevzer Stacey, Program Officer at the National Institute of Education in the Program on Educational Policy and Organization serves as the Project Officer for the Worker Education and Training Policies Project.